

The distribution of Bibionidae (Diptera) in Scotland, United Kingdom

[Die Verbreitung der Bibionidae (Diptera) in Schottland, Großbritannien]

by

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Abstract

We review the material of the family Bibionidae from Scotland in the Natural History Museum, London and the National Museums of Scotland, Edinburgh, as well as some material from other collections and published records from the SIRI (Scottish Insect Records Index). Eleven species of the genus *Bibio* GEOFFROY, 1762 and four species in the genus *Dilophus* MEIGEN, 1803 have been collected in Scotland. We review the distribution and ecology of each species and present maps of records. Previous Scottish records of *Bibio hortulanus* (LINNAEUS, 1758) and *B. reticulatus* LOEW, 1846 are deemed to be most likely erroneous. Additionally, we have not found any specimens confirming the literature record of *Bibio venosus* (MEIGEN, 1804), but we believe this record is most likely correct since this species is distinctive and well defined with no substantial confusion about its identity. There is also a recent record of *Dilophus humeralis* ZETTERSTEDT, 1850 which we have not been able to confirm. The following species have unambiguous records from Scotland: *Bibio clavipes* MEIGEN, 1818; *B. ferruginatus* (LINNAEUS, 1758); *B. johannis* (LINNAEUS, 1767); *B. lanigerus* MEIGEN, 1818; *B. leucopterus* (MEIGEN, 1804); *B. longipes* LOEW, 1864; *B. marci* (LINNAEUS, 1758); *B. nigriventris* HALIDAY, 1833; *B. pomonae* (FABRICIUS, 1775); *B. varipes* MEIGEN, 1830; *Dilophus bispinosus* LUNDSTRÖM, 1913; *D. febrilis* (LINNAEUS, 1758); *D. femoratus* MEIGEN, 1804.

Key words

Bibionidae, *Bibio*, *Dilophus*, Palaearctic Region, Europe, United Kingdom, Scotland, biology, faunistics, records, distribution

Zusammenfassung

Das schottische Bibioniden-Material im Natural History Museum in London und in den National Museums of Scotland in Edinburgh sowie Material aus weiteren Kollektionen und die im SIRI (Scottish Insect Records Index) publizierten Bibioniden-Nachweise werden einer Überprüfung unterzogen. Demnach wurden elf Arten der Gattung *Bibio* GEOFFROY, 1762 und vier Arten der Gattung *Dilophus* MEIGEN, 1803 in Schottland gesammelt. Die Verbreitung und Ökologie der einzelnen Arten wird aufgezeigt und Verbreitungskarten werden vorgelegt. Frühere schottische Nachweise von *Bibio hortulanus* (LINNAEUS, 1758) und *B. reticulatus* LOEW, 1846 werden als irrtümlich angesehen. Außerdem konnten keine Exemplare gefunden werden, die den Literaturnachweis von *Bibio venosus* (MEIGEN, 1804) belegen. Die Fundmeldung wird dennoch als gültig erachtet, da diese Art unverwechselbar ist und keine Zweifel an ihrer Identität bestehen. Es gibt auch eine neue Fundmeldung von *Dilophus humeralis* ZETTERSTEDT, 1850, die wir nicht bestätigen können. Für die nachfolgenden Arten gibt es eindeutige Nachweise aus Schottland: *Bibio clavipes* MEIGEN, 1818; *B. ferruginatus* (LINNAEUS, 1758); *B. johannis* (LINNAEUS, 1767); *B. lanigerus* MEIGEN, 1818; *B. leucopterus* (MEIGEN, 1804); *B. longipes* LOEW, 1864; *B. marci* (LINNAEUS, 1758); *B. nigriventris* HALIDAY, 1833; *B. pomonae* (FABRICIUS, 1775); *B. varipes* MEIGEN, 1830; *Dilophus bispinosus* LUNDSTRÖM, 1913; *D. febrilis* (LINNAEUS, 1758); *D. femoratus* MEIGEN, 1804.

Stichwörter

Bibionidae, *Bibio*, *Dilophus*, paläarktische Region, Europa, Großbritannien, Schottland, Biologie, Faunistik, Nachweise, Verbreitung

Introduction

Flies of the family Bibionidae are common members of many temperate climate ecosystems, in particular agroecosystems and grasslands. The imagines frequently occur in large numbers during their (often brief) flight periods. Bibionid larvae live in the soil/litter interface and may sometimes damage crops and gardens by eating roots (D'ARCY BURT & BLACKSHAW 1991). On the positive side, bibionid larvae are important agents of plant nutrient recycling, chewing dead vegetable material and thus accelerating its decomposition (e. g. FROUZ et al. 1999).

Scotland offers a wide range of suitable habitats for this family. Relatively mild winters in the lowlands may allow some species to extend their range rather far north. Much of the country has a rather wet climate, which is probably beneficial to bibionids since the larvae are highly susceptible to desiccation. The country also has a wide range of agricultural habitats of different management intensities, considerable areas of heathland and pockets of deciduous forest. In addition, special habitats such as machair (flower-rich seaside meadows growing on shell-sand) and alpine meadows may hold interesting bibionids, although few appear to have been collected in these habitats thus far.

The first person to record bibionids from Britain appears to be WALKER (1856), who listed 12 species of *Bibio* and 2 species of *Dilophus*. EDWARDS (1925) later revised the British bibionids, but neither he nor Walker provided distribution data. GRIMSHAW (1895–1920) published a series of regional species list of Scottish Diptera, which included a number of records of bibionids. DUDA (1930) thoroughly revised the Palaearctic species, but the revision was based on material in Central European museums and made few references to British material. FREEMAN & LANE (1985) in their identification handbook finally gave distribution data for the British bibionid species. Unfortunately their distribution records were based almost solely on the collections of the Natural History Museum, London, and so rather limited Scottish material was included. They also described *Bibio edwardsi*, based partly (one paratype) on Scottish material. This is the only nominal species described from Scotland. The key in FREEMAN & LANE (1985) remains adequate for identifying British bibionids. The latest checklist by CHANDLER (1998) added no new information on distribution. SAVILLE (2002) added a new species to the Scottish list, recording *Dilophus bispinosus* from Scotland. Finally, SKIDMORE (2008, 2009) provided a number a new records from the islands. The bibionids of neighbouring countries have been treated by D'ARCY BURT & CHANDLER (1987) for Ireland, PEDERSEN (1971) for the Faroes and SKARTVEIT (1995, 1996a) for Norway. The larvae of British bibionids were described by BRINDLE (1962) and SKARTVEIT (2002a).

Materials and methods

Sources of Information

Specimens in the collections listed below have been examined and the identities checked prior to inclusion in the list below:

- DSPC – Duncan SIVELL private collection, London, United Kingdom
- MLURI – Macaulay Land-use Research Institute, Aberdeen, United Kingdom
- NHML – Natural History Museum, London, United Kingdom
- NMSE – National Museums of Scotland, Edinburgh, United Kingdom
- TAUI – Tel Aviv University, Tel Aviv, Israel
- UZMH – University Zoological Museum, Helsinki, Finland

Specimens in the authors' collections are also included. 239 literature based records originate from SIRI (the Scottish Insect Records Index) held and updated at the National Museums of Scotland, with the exception of the records of GRIMSHAW (1895, 1899, 1900, 1903, 1905, 1907) which were not included there, presumably because PERCY GRIMSHAW established SIRI initially for his own personal use and would be fully aware of his own data. Specimens in the collections match some of these records, and all are taken at face value, other than updating names to the currently valid senior synonyms. Records published by SKIDMORE (2008, 2009) are also included. Where possible the collector of the specimens and/or the author of the published papers listed in SIRI are given. Records from the North East Scotland Biodiversity Record Centre (NESBReC), Aberdeen are also included. In addition to the records included here, there are numerous unpublished records available at the National Biodiversity Network (<https://data.nbn.org.uk/>) which we have not been able to include in the present paper.

Collection dates have the format DAY.[Roman]MONTH.YEAR, for example, 17.v.1896. Numbers designated AH (e.g. AH150-B) refer to the Scottish Wildlife Trust Garden Survey of 1998. Finally, location is designated by

various means. Sometimes the Vice-County designation appears on the specimen label (e. g. Vc84), in the cases the precise latitude and longitude is provided, while in many instances the UK national grid system is used – in most cases these are four figured (e. g. NH9013), but occasionally a more precise six figure is given (e. g. NT233772) (see HEATH & SCOTT 1972).

Records

A complete list of the records included is given in an **Appendix**. We list the records for each species, giving the label data associated with the specimen except for obvious redundancies, misspellings and disused versions of place names, also including the number of male (♂) and female (♀) specimens. In a few cases, we did not record the number and sex of the specimen(s), or the record was based on larvae, which cannot be reliably sexed except just before pupation (SKARTVEIT 1999). In such cases the term ‘example’ (ex) is used.

Distribution maps were plotted by hand. As can be expected with data from a large number of sources, the level of precision in the specimen data is highly variable and some records refer to rather large areas so that the exact position of the record is difficult to ascertain. A few records were left out because we could not trace the locality name, because the locality was most likely not in Scotland (though the specimen was placed among Scottish material), or because the locality was given as just “Scotland”. The records are arranged under current political regions (based on population size), but a list of vice-counties represented is also included. The Watsonian vice-counties are relatively small regional units based on the old county divisions, but roughly standardized in land area by sub-division of the larger ones (DANDY 1969).

Genus and species accounts

Bibio GEOFFROY, 1762

Synonyms: = *Pullata* HARRIS, [1780]; = *Hirtea* FABRICIUS, 1798.

Known species: World = 200; Palaearctic Region = 90; Britain = 14.

Brief description of the genus. Imagines: Stout, strongly built flies, 4–12 mm long. Legs generally thick, front tibia usually thickened, with a long, more or less pointed apical projection opposite the tibial spur. All tibiae with an area with rounded sensilla on the anterodorsal surface. Front first tarsomere long and slender. Wing rather broad, with distinctive venation throughout: R_{2+3} unbranched, basal part of $R_s \geq r-m$. Female: eyes dichoptic, body pile short, abdomen stout. Male: eyes holoptic, usually with copious, long, intraocular pile, body and legs generally with long pile, abdomen slender, epandrium more or less bilobed, gonostylus simple, sickle-shaped. **Larvae:** generally dirty-whitish to reddish-brown, with body covered in strongly sclerotised, cuticular scales and finger-like projections. Posterior spiracle with two ecdysial scars.

Biology and general distribution. *Bibio* species are almost cosmopolitan; of the major land areas they are absent only from Antarctica and New Zealand. They are most diverse in the Northern Hemisphere and in cool climates – rather few species live in the warm tropics. A number of species have quite wide distributions (FITZGERALD & SKARTVEIT 1997). Some species live at high altitudes and latitudes – *Bibio* species have been recorded from 5300 m in Himalaya (SKARTVEIT 1997) and as far north as Novaja Zemlya and Baffin Island (FITZGERALD & SKARTVEIT 1997). Most species are found in grasslands and heathlands, but there are also forest-living species. A number of species reach high numbers in agroecosystems and a few may damage crops (D’ARCY BURT & BLACKSHAW 1991). Most species swarm in spring, but there are also some autumn-swarming species. Males hover in the air with the hind legs hanging down. For most of the species the swarming period is quite short (SKARTVEIT 2001). Many species appear not to feed in the adult stage but some feed on nectar and honeydew. Fecundity varies a lot between species, but can be quite high in the larger species – females of *Bibio marci* may lay up to 4000 eggs (SKARTVEIT 2002b).

Females oviposit their entire egg-load in one batch in a chamber dug out in the soil, and the larvae from one egg-batch seem to stay together during the larval period so they are generally found in dense clusters. The

larvae are mainly phytosaprophagous, but some species, notably *Bibio hortulanus*, may eat living plants. The generation time is generally a year in lowland populations but may be prolonged at high altitudes (SKARTVEIT & SOLHØY 1997). Some species, notably *Bibio pomonae*, may have spectacular mass occurrences.

***Bibio clavipes* MEIGEN, 1818**

(Map 1)

Remarks. The systematic relationship between *Bibio clavipes* and *B. longipes* appears to be complicated. The two species are clearly separate in Scandinavia and Britain, where intermediates seem not to occur, and there also appears to be some degree of ecological separation between them (SKARTVEIT 1995). On the other hand, in Central Europe “*B. clavipes*” and “*B. longipes*” appear to intergrade and in the same population, specimens that are typical *clavipes*, specimens that are typical *longipes* and various intermediates co-occur (DUDA 1930). The present state of knowledge suggests it is advisable to recognize just one species in this group in Central Europe but two species in Scandinavia and Britain.

General description. Medium-sized, slender species. Quite similar to *Bibio longipes* but generally larger, and normally easily separated from it by the milky-white colour of the wings. The stigma is brown and does not extend into the costal cell; it is usually quite invisible in the male, while in the female it is clearly visible (FREEMAN & LANE 1985: Fig. 18). The males generally have the palps more slender than in *B. longipes* (FREEMAN & LANE 1985: Fig. 29), but the difference is rather small. Usually, females can be easily distinguished by colour – female *B. clavipes* rarely have the body and legs all black, while this is normally the case with *B. longipes* females. Antennal flagellum 7-segmented.



Maps 1, 2: Records of bibionid species in Scotland. – 1: *Bibio clavipes* MEIGEN; –2: *Bibio ferruginatus* (LINNAEUS) [diamonds] and *Bibio johannis* (LINNAEUS) [circles].

Biology. This is an autumn-flying species, imagines are found between July and October, with the majority of specimens taken in late August to late October (Table 1). It is probably most abundant in open woodland, but can also be found in heathland and upland situations. It appears to be a somewhat more continental species than *B. longipes*. In Scandinavia *B. longipes* predominates along the west coast and *B. clavipes* further east (SKARTVEIT 1995). This species is rarely found in large numbers. It is commonly caught in light traps (SKARTVEIT *et al.* 2005), showing that it is probably partly nocturnal. *B. clavipes* occurs across most of the Palaearctic region.

Distribution in Scotland. The species appears to be widely distributed but relatively uncommon in Scotland, though the sparsity of records may be partly due to its late flight period. There are few records from the western part of Scotland. That corresponds well with its distribution in Norway where it is most common in the eastern and inland areas, usually being replaced by *Bibio longipes* on the west coast (SKARTVEIT 1995). GRIMSHAW's record from HARRIS (specimen not seen by us) may be *Bibio longipes* (SKIDMORE 2009).

Vice-county records: 72, 73, 74, 78, 79, 81, 82, 83, 84, 85, 88, 96, 98, 99, 106, 108, 110.

***Bibio ferruginatus* (LINNAEUS, 1758)**
(Map 2)

Synonym: = *nigripes* MEIGEN, 1818.

General description. A small, compact, dark species. Both sexes have a rusty-red tint that gets more pronounced with age in preserved specimens. The wings are rather dark fumose. Antennal flagellum 8-segmented.

Biology. *Bibio ferruginatus* is often found in agroecosystems, but rarely reaches high numbers, although it has been reported as a pest species from Denmark (BOVIEN 1932). It occurs over most of Europe, but is rare in the north, for instance, just three specimens are known from Norway (SKARTVEIT 1995, and pers. observation). In Scotland, the flight period is in May–June (Table 1).

Distribution in Scotland. We have only found two Scottish specimens of this species; the one from Tongue, Sutherland is a quite surprising location for an otherwise rather southern species, and mislabeling or introduction cannot be ruled out. The species was also recorded from the Isle of Lismore by SKIDMORE (2009). It has been recorded sporadically from Norway far to the north of this though, so occurrence in Sutherland is not impossible. Its ecological requirements may be rather similar to those of *Bibio lanigerus*, which is quite common in south-west Scotland.

Vice-county records: 85, 98, 108.

***Bibio hortulanus* (LINNAEUS, 1758)**

Remarks. The presence of this species in Scotland was indicated by WALKER (1856: 136) but has not been confirmed by any later authors nor by any specimen that we are aware of. It occurs as far north as southernmost Sweden in Europe, in Britain reliable records exist only from S. England (FREEMAN & LANE 1985). This species is not very likely to occur in Scotland, except perhaps as introduced with plants or soil. In the past, *B. hortulanus* has frequently been confused with *B. marci* and sometimes also with *B. varipes* (SKARTVEIT 1995), we believe such confusion is likely to be the cause of WALKER's record.

***Bibio johannis* (LINNAEUS, 1767)**
(Map 2)

General description. A small, compact species. Wing lightly greyish fumose with a very distinctive, dark brown stigma. Antennal flagellum 7-segmented. Male (Freeman & Lane 1985 Fig. 1) with all-black thoracic and abdominal pile, hind tibia dirty yellowish with a dark field of sensilla very conspicuous on the anterodorsal surface along almost the whole length of the tibia, hind first tarsomere swollen. Female black with red legs.

Biology. This is a very common species in agroecosystems, although it may be overlooked due to its early flight period. It is usually the first bibionid species on the wing in Northern Europe. The first imagines may



Maps 3, 4: Records of bibionid species in Scotland. – 3: *Bibio lanigerus* MEIGEN; – 4: *Bibio leucopterus* MEIGEN.

3

4

appear around the start of April (the earliest records from Scotland are 28 March), and the flight period (March to May in Scotland (Table 1)) lasts about two weeks at any one spot (SKARTVEIT 2001), but most of the activity is often concentrated in 1–3 days. This species does not feed in the adult stage, and adult lifetime probably rarely exceeds two days (SKARTVEIT 2001). During the swarming period, males, which hover a foot or so above the ground, are very abundant, while the females are less frequently seen. Material caught in yellow water traps often is > 99 % males (SKARTVEIT 2001). The species is abundant both on arable land and pasture, but appears to be less common in natural habitats. Though the larvae are mainly saprophagous, *B. johannis* has been noted as an occasional crop pest (FREEMAN & LANE 1985, D'ARCY BURT & BLACKSHAW 1991).

Distribution in Scotland. In Scotland this species occurs mainly in the south, though there are also records from Skye and Rùm. In addition to the areas from which we have records, the species is unlikely to be absent in any area with substantial agricultural activity such as Islay, Borders and Aberdeenshire. It is probably under-sampled due to its early flight period and living in areas with low insect diversity, thus rarely given any attention by collectors. Notably, the third author collected numerous specimens on snowfields at altitudes above 1000 m. Its swarming is also less conspicuous than for many other bibionids since this species flies quite low over the ground and does not visit flowers.

Vice-county records: 72, 74, 75, 80, 82, 83, 84, 85, 86, 88, 90, 98, 99, 100, 104.

Bibio lanigerus MEIGEN, 1818

(Map 3)

Synonym: = *hybridus* HALIDAY, 1833.

Remarks. DUDA (1930) synonymised *B. hybridus* with *B. lanigerus*, stating that there were no constant differences between the two nominal species. However, FREEMAN & LANE (1985) raised *B. hybridus* to species

rank again, but gave no distinguishing characters except the colour of the male pile, which is highly variable in this species. They explicitly stated that females of *B. hybridus* and *B. lanigerus* were indistinguishable. KRIVOSHEINA (1986) listed *B. hybridus* as a synonym of *B. lanigerus* in the most recent catalogue, a view with which we agree (SKARTVEIT 2006). If one studies a long series of this species, it is obvious that the colour of the male thoracic and abdominal pile is rather mixed and variable, and so useless for distinguishing different species.

General description. A small-medium sized, stoutly built species. Antennal flagellum 7-segmented. Male thorax and abdomen with copious and very long pile of varying colour, most commonly light-coloured pile predominates (“*lanigerus*”) but some specimens have a large fraction of the hairs dark (“*hybridus*”). Typical specimens have light thoracic pile with a characteristic “foxy” reddish colour. The wings are quite dark fumose (notably darker than in *B. johannis*). The male hind basitarsus is somewhat swollen (FREEMAN & LANE 1985: fig. 39), unlike *B. varipes* which has a very slender basitarsus. The female is black with red legs and can be distinguished from *B. johannis* chiefly on the dark fumose wings.

Biology. This is one of the first species on the wing in spring and frequently swarms together with *B. johannis*, although it seems to start emerging a few days after this species. In Scotland, the flight period is April and May (Table 1). Its distribution does not extend quite as far north as *B. johannis*, nor is it as common as this species, but it is found in similar situations, and is also a typical species in agroecosystems. Surprisingly for such a common species, the larva is still undescribed (SKARTVEIT 2002).

Distribution in Scotland. The species is widespread in Scotland but appears to be absent in the northernmost parts. It does generally not occur in upland areas, but has been found at Aviemore, which although this location is inland, it is just about 200 metres above sea level and the third author took several specimens on snowbeds around 1000 m, which may have been wind-blown specimens.

Vice-county records: 72, 73, 74, 75, 77, 78, 82, 83, 84, 85, 86, 88, 90, 92, 95, 96, 98, 99, 100, 104, 105.

Bibio leucopterus (MEIGEN, 1804)

(Map 4)

General description. *Bibio leucopterus* is a middle-sized, rather slender species that differs from all other British *Bibio* species in having a front tibial spur which is almost as long as the tibial spine (FREEMAN & LANE 1985: fig. 25). The species is habitually rather similar to *B. marci*, with which it is often found together, but is markedly smaller, and the males have long, white abdominal pile. Antennal flagellum 9-segmented, body and legs black in both sexes, wings milky-white in male, dark blackish fumose in female. The males are quite similar to males of *Bibio hortulanus* in size and general habitus, but easily distinguished by the long front tibial spurs, and by the crossvein *r-m* being roughly as long as the radial sector (as in FREEMAN & LANE 1985: Fig. 18).

Biology. *Bibio leucopterus* has been found in or near woodlands, as well as swarming over hedgerows. The specimens from Ayrshire and Arran were found together with large numbers of *Bibio marci* and *B. varipes*, suggesting that *B. leucopterus* has a similar biology to these species. Recorded from Scotland from April to July (Table 1).

Distribution in Scotland. *Bibio leucopterus* was not mentioned from Scotland by FREEMAN & LANE (1985), nor are there any Scottish specimens in the Natural History Museum, London. There are, however, numerous records from the southern part of Scotland and also records from Highland, Aberdeenshire and Perth and Kinross. Like *Bibio varipes* this species mainly occurs along the coast in Scotland.

Vice-county records: 72, 73, 74, 75, 76, 78, 80, 81, 82, 83, 84, 85, 86, 87, 88, 93, 98, 99, 100, 103, 104, 105, 107.

Bibio longipes LOEW, 1864

(Map 5)

Synonym: = *lepidus* LOEW, 1871.

Remarks: Recently, *Bibio lepidus* has been synonymized with *B. longipes*, which is a common species in eastern North America (SKARTVEIT 2006). On the relationship to *B. clavipes*, see comment under *B. clavipes*. Unambiguous *B. longipes* have been recorded from Britain, Fennoscandia and Northern Russia in Europe.

General description. *B. longipes* is habitually rather similar to *B. clavipes*, but on average slightly smaller. The wings are glassy-clear, with a distinctive, dark brown pterostigma in both sexes. The pterostigma extends into the costal cell (FREEMAN & LANE 1985: Fig. 19). The male palps are somewhat shorter than in *B. clavipes* (FREEMAN & LANE 1985: Fig. 30). The female is all black, while *B. clavipes* females usually have the thorax and/or legs more or less yellowish.



Maps 5, 6: Records of bibionid species in Scotland. – 5: *Bibio longipes* LOEW; – 6: *Bibio marci* (LINNAEUS).

5 6

Biology. Like *B. clavipes*, this is an autumn-flying species, which swarms in September and October (Table 1). The imagines seem to be rather hardy, and have been seen swarming 30 minutes after a small snowfall in Norway (SKARTVEIT, pers. obs.). Compared to *B. clavipes*, it seems to have a more western distribution, and occur more frequently on open moorlands and heathlands, while *B. clavipes* is more commonly found in woodlands. It can be found at fairly high altitudes, at least up to 1100 m (at Beinn Ghlas, Lawers, Perthshire) in Scotland. The species frequently occurs very abundantly and has been noted as being eaten in large numbers by pheasant (GRIMSHAW 1912) and partridge (EVANS 1912).

Distribution in Scotland. The species appears to be generally distributed in Scotland, though there are few records from areas to the west of the Great Glen. Undoubtedly, like *B. clavipes*, it is undersampled due to its late flight period. The first author did not find it in Ayrshire and Arran despite some searching, though, so its absence from those areas seems to be real.

Vice-county records: 74, 82, 83, 85, 86, 88, 89, 90, 92, 96, 97, 98, 103, 104, 108.

***Bibio marci* (LINNAEUS, 1758)**
(Map 6)

Synonym: = *funerosus* (HARRIS, [1780]).

Remarks. In the past, there has been some confusion about the “*B. hortulanus*-group” including the species with a short *r-m* crossvein (FREEMAN & LANE 1985: Figs 16, 17) and black legs. For instance, DUDA (1930) treated *B. marci* as a junior synonym of *B. hortulanus* [which anyway is a mistake since *B. marci* was described before *B. hortulanus* (but on the same page) by LINNAEUS (1758)]. DUDA’s synonymisation has not been widely followed but it is possible that some older records of “*Bibio hortulanus*” may actually refer to *B. marci*.

General description. *Bibio marci* is one of the most characteristic bibionid species. It is large, with a wing length of 8–12 mm, with completely black body and legs in both sexes. The wings have a short crossvein *r-m*, which is roughly half as long as the Radial sector (FREEMAN & LANE 1985: Fig. 16). The hairs of the body and legs are black in both sexes. The wings of the males are milky-white with strikingly black radial veins; those of the female are blackish fumose. The antennal flagellum is occasionally 7-segmented, more commonly 8-segmented.

Biology. *Bibio marci* is a rather thermophilic species occurring in comparatively warm habitats. It appears to be quite common in the South-west. The conspicuous, large males of *B. marci* are often seen swarming over hedgerows in Ayrshire, and it is likely that the larvae develop under the hedges. The species also occur in deciduous woodlands and parks. Towards the northern limit of its distribution it occurs almost exclusively in warm, seaside meadows (SKARTVEIT 1995). *Bibio marci* larvae have been reported to damage crops and ornamental plants on some occasions [listed by FREEMAN & LANE (1985)], but no such damage appears to have been reported from Scotland. In Scotland, immature stages were noted in mid and late March. The main flight period for adults is late April and May, although specimens have been collected in earlier in April with some stragglers in June (Table 1).

Distribution in Scotland. This very conspicuous species obviously has a coastal distribution in Scotland. In addition to the records included here, the species has recently been recorded from numerous localities along the north and north-west coasts of Scotland (<https://data.nbn.org.uk/Taxa/NBNSYS0000027786>).

Vice-county records: 72, 73, 74, 75, 78, 80, 81, 82, 83, 84, 85, 88, 92, 93, 96, 100, 106.

***Bibio nigriventris* HALIDAY, 1833**
(Map 7)

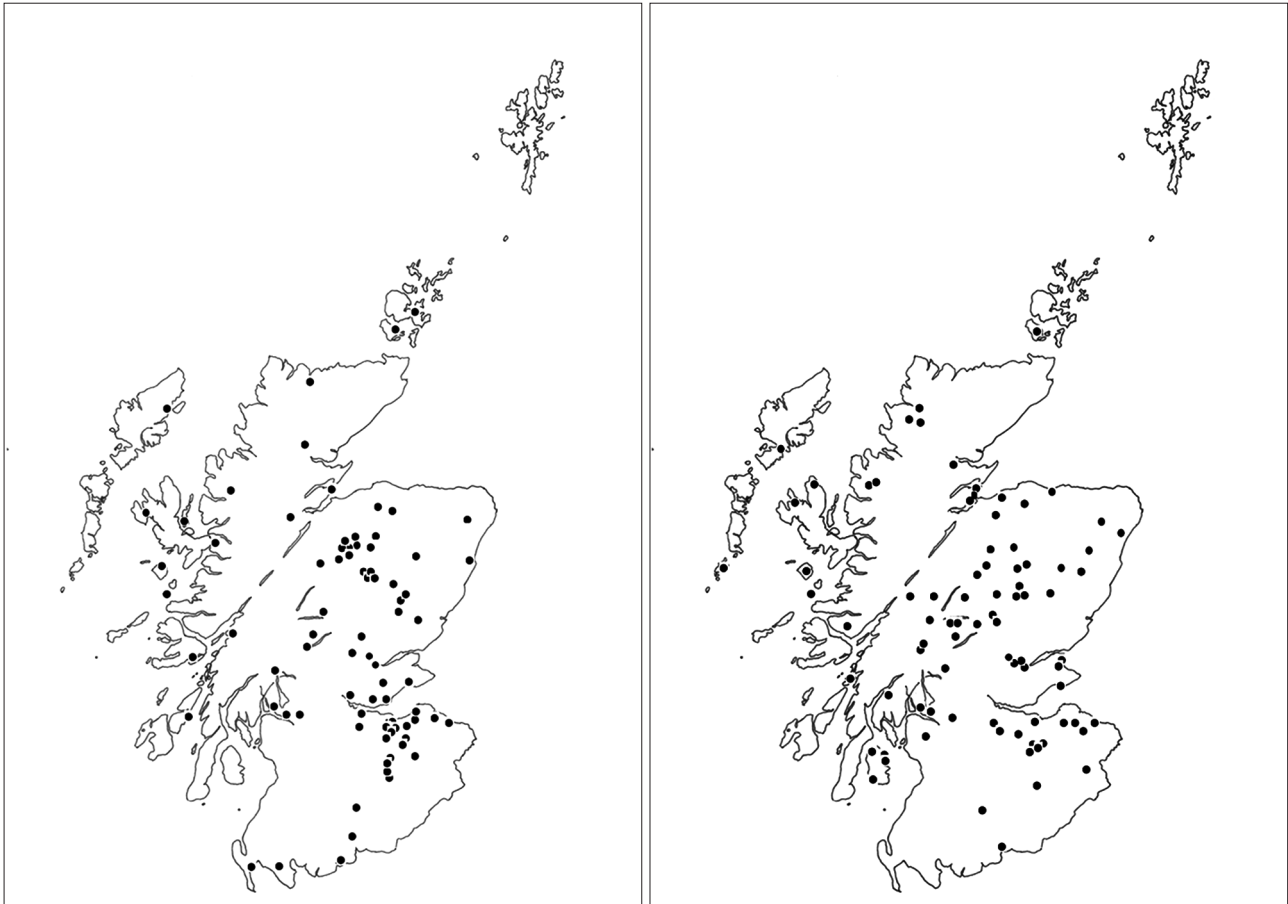
Synonym: = *lacteipennis* ZETTERSTEDT, 1850.

General description. A small-medium sized species most easily recognized on its 5-segmented antennal flagellum (FREEMAN & LANE 1985: Fig. 28). Habitually it is most similar to *Bibio johannis*, *B. lanigerus* and *B. varipes*, but differs from all these species in that the wings are practically glassy-clear, at most slightly fumose. The female is easily recognised by its brown posterior wing veins, which stand out clearly against the clear wing-membrane. The other Scottish species with light-coloured wings have colourless posterior veins.

Biology. It is a quite eurytopical species with a liking for woodlands. In Norway, it is the commonest *Bibio* species (SKARTVEIT 1995), and this is likely to be the case in the Scottish Highlands as well. Adults of this species have been found in the crops of grouse chicks (GRIMSHAW 1910). In Scotland the flight period is predominantly May and June, spilling over into July, but occasional specimen occur in April and August (Table 1).

Distribution in Scotland. Although it is a smallish species that rarely forms conspicuous mass aggregations, *B. nigriventris* has been collected from all over Scotland except Ayrshire (its presence in Shetland was indicated by SKIDMORE (2009) without any further details). In Ayrshire, the first author has collected extensively in areas, which appear suitable for this species without encountering it, which we find puzzling. In Norway (SKARTVEIT 1995) this species is ubiquitous, we would expect this to be the case in Scotland too.

Vice-county records: 72, 73, 74, 78, 80, 82, 83, 84, 85, 86, 88, 90, 91, 92, 96, 98, 99, 100, 102, 104, 106, 107, 108, 110, 111, 112.



Maps 7, 8: Records of bibionid species in Scotland. – 7: *Bibio nigriventris* HALIDAY; – 8: *Bibio pomonae* (FABRICIUS).

7

8

Bibio pomonae (FABRICIUS, 1775)

(Map 8)

Synonym: = *funestus* (HARRIS, [1780]).

General description. *B. pomonae* is unmistakable due to its large size and bright red femora. Habitually, it is rather similar to *B. marci* but the colour of the femora at once distinguishes it from this species. The antennal flagellum is 8-segmented, and the wings have short *r-m* crossveins like in *B. marci* (see FREEMAN & LANE 1985: Fig. 16). The females further differ from *B. marci* in that the wings are almost clear, only slightly fumose.

Biology. While this species can be found almost anywhere in Scandinavia, in Scotland it is very much a species of the heathlands. On still late-summer days the males can be seen hovering in large numbers 2–3 metres above the heather. Numbers of this species seem to fluctuate a lot, and it may have spectacular mass-occurrences in some years, while adults seem to be entirely absent in others. The life-cycle is probably semivoltine (SKARTVEIT & SOLHØY 1997). Unlike many other *Bibio* species adults of *B. pomonae* are frequently found feeding from flowers. The flight period is more prolonged than in most other *Bibio* species, and in Scotland adults are commonly found in July–September, although specimens have been recorded from May through to October (Table 1).

Distribution in Scotland. The species appears to be generally distributed in Scotland except for the south-westernmost part, where it appears to be scarce or absent in Ayrshire and Dumfries and Galloway. Most records are from inland localities but it has also been found at relatively small islands such as Barra and Garbh Eileach in Argyll. It is probably the cold-hardest of the bibionid species which have been recorded from Scotland, and has been collected at altitude of 1044 metres on the summit of Meall nan Tarmachan, Perthshire, which is plausible since it lives up to 1300 m a. s. l. in Southern Norway (SKARTVEIT 1995).

Vice-county records: 72, 76, 78, 80, 83, 84, 85, 86, 88, 90, 92, 93, 95, 96, 97, 98, 99, 100, 104, 105, 106, 108, 110, 111.

***Bibio reticulatus* LOEW, 1846**

Remarks. FREEMAN & LANE (1985) mentioned that this species was known from Scotland; however, all the Scottish specimens placed under this species name in NHML were either males of *B. lanigerus* or males and females of *B. nigriventris*. It seems unlikely that this south-central European species occurs in Scotland. There is a single unconfirmed record from SIRI, likely also to be based on a misidentification.

***Bibio varipes* MEIGEN, 1830**

(Map 9)

Misidentification: = *hybridus* HALIDAY sensu EDWARDS (1925) [nec HALIDAY (1833); = *edwardsi* FREEMAN & LANE, 1985].

Remarks. FREEMAN & LANE (1985), realising that *B. hybridus* sensu EDWARDS (1925) was not conspecific with *B. hybridus* HALIDAY, renamed the former *B. edwardsi*. The first author, having studied the types of *B. edwardsi* as well as specimens of *B. varipes* collected in Ayrshire, came to the conclusion that *B. edwardsi* was merely a colour variety of *B. varipes* (SKARTVEIT 2006). *Bibio edwardsi* was said to differ from *B. varipes* in having pale rather than black thoracic pile (FREEMAN & LANE 1985). However, Scottish populations of *B. varipes* are highly variable in this respect, with pile colour ranging from pure black through various intermediate conditions to yellowish white. Interestingly, the pale-haired variety seems not to have been recorded outside Britain, but still there is nothing to suggest it is a good species.

General description. A medium-sized species, antennal flagellum 7-segmented, wings greyish fumose. Male legs of variable colour (hence the Latin name), frequently all black in Scottish specimens, thoracic pile rather long, yellowish-white to black, abdominal pile copious and pale. The hind basitarsus of the male is quite slender (FREEMAN & LANE 1985: fig. 38). The mesonotum is strongly wrinkled and less shiny than in most other species. Females usually have yellowish-red legs and the abdomen ventrally yellow, however some all-black *Bibio* females collected in western Norway apparently are melanistic *B. varipes* (SKARTVEIT, pers. observation). This colour variety may well occur in Scotland as well.

Biology. *Bibio varipes* frequents woodlands and is rarely found in open areas, it is the only British bibionid confined to wooded areas. The larvae are often abundant among leaf litter in Norway and can probably be found under similar conditions in Scotland. The Scottish records are mainly from early May-early and June, but specimens have been collected as early as March and April (Table 1).

Distribution in Scotland. The species is fairly widespread and common in the southern part of Scotland, and also has been collected in the northwestern part of the country. Though mainly a coastal species, it penetrates far inland along some of the major glens, probably being limited by the extent of deciduous woodland.

Vice-county records: 74, 75, 79, 82, 83, 84, 85, 86, 88, 90, 96, 97, 99, 100.

***Bibio venosus* (MEIGEN, 1804)**

General description. A quite unmistakable species, medium-sized to quite large. It is of a notably more slender build than all other European *Bibio*, in particular the male head is conspicuously small and the front tibiae are quite slender, whereas all the other species have stout front tibiae. Body and legs are all black in both sexes, the sides with conspicuous, white pile. The wings are comparatively large, milky-white with strongly pigmented, brown veins throughout, in that respect the male is unique among North European bibionids, the female similar only to the much smaller and stockier *B. nigriventris*.

Biology. There seems to be little information regarding the biology of this species, which appears always to be relatively scarce. MORRIS (1921) found its larvae among leaf litter. Adults fly in May.

Distribution in Scotland. The species was listed from Perth and Kinross by GRIMSHAW (1895). We have not seen any specimens from Scotland but it seems unlikely that this highly distinctive species has been misidentified, though mislabelling remains a possibility. FREEMAN & LANE (1985) only listed British records from the southern

part of England and Wales, but the species has been found as far north as the southernmost Sweden (KARLE 1994). The Scottish record is well over 100 years old; it seems peculiar that no further records have arisen if this very conspicuous species still lives in the country.

Vice-county record: 88.



9 10

Maps 9, 10: Records of bibionid species in Scotland. – 9: *Bibio varipes* MEIGEN [circles] and *Bibio venosus* MEIGEN [diamonds]; – 10: *Dilophus bispinosus* LUNDSTRÖM [circles] and *D. humeralis* ZETTERSTEDT [diamonds].

Dilophus MEIGEN, 1803

Synonym: = *Philia* MEIGEN, 1800. The name *Philia* was suppressed in the Opinion 678 by ICZN (1963), together with the other genus-group names published by MEIGEN (1800).

Known species: World = 190; Palaearctic Region = 32; Britain = 4.

Brief description of the genus. Imagines: Small to medium-sized flies, 3–8 mm long in Northern Hemisphere species (some in the Southern Hemisphere grow bigger). Body generally shiny and moderately pilose. Mouthparts telescopic, frequently prolonged. Thorax dorsally with two transverse rows of spines. Acrostichal area bare and generally shiny. Femora stout, front tibia cylindrical, with one or more groups of spines near the middle and a circle of 6–12 strong spines apically. Tibial sensilla may be present but less prominent than in *Bibio* species. Wing triangular in outline (FREEMAN & LANE 1985: Fig. 15), R-veins generally stronger than the more posterior veins, which can be rather faint. R_{2+3} unbranched. Basal part of $R_s < r-m$. Female: yellowish to brownish in most species, legs rarely entirely dark (*D. febrilis* is an exception). Male: eye with rather short and sparse intraocular pile, sometimes entirely bare. Epandrium usually more or less rectangular, rarely bilobed. Gonostylus simple, usually more or less cylindrical or clavate. **Larvae** (rather few species have been described): Whitish or yellowish, cuticular scales present but less prominent than in *Bibio* species, body projections fewer than in *Bibio* species, short and wart-like. Posterior spiracle with three ecdysial scars.

Biology and general distribution. The species of *Dilophus* are nearly cosmopolitan but they don't go as far north or as high altitudinally as the *Bibio* species. The genus is most diverse in the Southern Hemisphere. *Dilophus* species are common in agroecosystems and some, notably *Dilophus febrilis*, may become pests. Larval biology similar to *Bibio* species, but some species are bivoltine, with spring and autumn generations. Like *Bibio* species the males hover, but the hind legs are stretched backwards and the abdomen curled forwards over the back, giving them a characteristic “scorpion” habitus. *Dilophus* species are commonly found on flowers, particularly umbellifers, where they feed on nectar and possibly also pollen. They may be of some importance as pollinators.

Dilophus bispinosus LUNDSTRÖM, 1913

(Map 10)

Misidentification: = ? *tenuis* MEIGEN, 1818 sensu SIRI records.

General description. A small species, probably the smallest British bibionid on average, with a wing length of approximately 4 mm. Easily recognised by the mesal spines of the front tibia, which are arranged “2+2” (FREEMAN & LANE 1985: Fig. 21). The male (as illustrated by SKARTVEIT & KAPLAN, 1996) has the gonostylus expanded apically, but less so than in *D. femoratus*. The legs of the male may be yellowish unlike the other British *Dilophus* species. The female is easily recognised due to its ochreous-yellow body.

Scottish records. This species was published from Scotland by SAVILLE (2002). Apparently, *D. bispinosus* is widely distributed in Southern and Central Europe and the Middle East (HAENNI 1997, SKARTVEIT & KAPLAN 1996), but it appears to be rare everywhere. All the British records are from August and September (FREEMAN & LANE 1985, SAVILLE 2002). The first Scottish specimen was collected by sweep-netting in open deciduous woodland (SAVILLE 2002). We failed to locate the specimen in the NMSE collection and it may possibly be lost, thus we are unable to confirm the record. However, a second female specimen confirmed by the first author, was collected at Falkland Palace, Fife in August 2012 (Table 1).

HARDY (1848) reported *Dilophus tenuis* MEIGEN from Redheugh, Berwickshire. This record might refer to *D. bispinosus*, though this may seem doubtful since HARDY reported the species to be “abundant”, whereas *Dilophus bispinosus* seems to be scarce throughout its range. HARDY (1848) gave a brief description of the female; this does not fit *D. bispinosus* as it makes no mention of the unusual, ochreous body colour, but would fit *Dilophus femoratus* well. *Dilophus tenuis* is a senior synonym of *D. ternatus* LOEW, 1846, the nominal species from which *D. bispinosus* was separated in 1913. *Dilophus bispinosus* was recognised as British by COLLIN, as cited by EDWARDS (1925). Any pre-1925 record of *D. bispinosus* would probably be referred to *D. ternatus*, which is today called *D. tenuis*. *Dilophus tenuis* as it is currently understood is unlikely to occur in Britain, as it has not been recorded further north than Austria.

Vice-county records: 83, 85.

Dilophus febrilis (LINNAEUS, 1758)

(Map 11)

Synonym: = *spinatus* (MÜLLER, 1764).

General description. A small to medium sized bibionid, on average the largest of the British *Dilophus*, though the adult size is highly variable. The female is easily recognisable since it is all black, at first sight looking like a miniature *Bibio marci*. The male is most readily recognized on the anterior (R) wing veins being black – the other *Dilophus* species have brownish or pale R-veins. The legs are all black. Further, the mesal spines of the front tibia are usually arranged in a “3+1” pattern (FREEMAN & LANE 1985: Fig. 20), though the single spine that is distal to the others may sometimes be missing. The male gonostylus is rather strong, slightly curved and pointed (HAENNI 1982).

Biology. *Dilophus febrilis*, known as the Fever Fly, is a widespread, common and frequently abundant (e. g. EDWARDS 1941) species. It is quite eurytopical but is less common in woodlands and at higher altitudes. Single specimens have been found on mountain summits (e. g. summit of Cir Mhor on Arran) and numerous specimens

on snowfields (collected by K. P. BLAND); these may have been caught by the wind at lower altitude and blown to these heights. *Dilophus febrilis* is the bibionid most frequently causing damage to crops and gardens in Britain (FREEMAN & LANE 1985). The white grubs feed in large aggregations on the roots and leaf bases of various plants. With severe damage, an entire grass tussock may be lifted like a wig, all the bases being severed by the larvae. Damage is most commonly reported to grasses such as cereals and amenity grass such as lawns, football fields and golf courses. Both sexes of *D. febrilis* are frequently found feeding in various flowers. They are also frequently taken as nuptial prey by some empidid flies (DISNEY 1978, SKARTVEIT 1996b) and are sometimes easier to find in an empidid's grip than alive. This species is bivoltine, and adults are mainly found in April–May and in August–September, though some may be found at any time during the year – the only two months for which there are as yet no records are February and March (Table 1).

Distribution in Scotland. The species appears to be generally distributed in Scotland though probably less common in the north. It has not been recorded from some of the islands, though records from Orkney and Lewis suggest that it is unlikely to be absent in any major Scottish island. The lack of records from Aberdeenshire probably reflects the general shortage of specimens from this area in the collections that we examined. In Norway, this species has had a major range expansion in the last 20 years (SKARTVEIT, pers. observation).

Vice-county records: 72, 74, 75, 76, 78, 80, 81, 82, 83, 84, 85, 86, 88, 90, 96, 98, 99, 100, 102, 104, 108, 110, 111.

Dilophus femoratus MEIGEN, 1804

(Map 12)

Synonym: = *albipennis* MEIGEN, 1830.

General description. A small bibionid, on average slightly smaller than *D. febrilis*. The front tibia has four mesal spines on a single, obliquely-transverse row (FREEMAN & LANE 1985: Fig. 22). The spines are markedly stouter than those of *D. febrilis*, obvious if one compares specimens of the two species. The wings are milky-white in both sexes, in the male with the R-veins light brownish. The female has a conspicuous, large, brown pterostigma. The male genitalia, as seen from below, are deeply indented between the gonocoxites (FREEMAN & LANE 1985: Fig. 6). The gonostylus is quite robust, apically expanded, hammer-like (this is not visible in FREEMAN & LANE's Fig. 6). The legs are all-black in the male, the female usually has yellowish-red femora and black tibiae.

Biology. *D. femoratus* is commonly found together with *D. febrilis*, the two species may even form mixed larval aggregations (SKARTVEIT 2002a). It is mostly less abundant than *D. febrilis*, but may replace this species in the north and at higher altitudes. Unlike *D. febrilis* it is univoltine, with a flight period between May and July, predominantly June (Table 1). Adults of *D. femoratus* commonly appear 2–3 weeks after the emergence of the first *D. febrilis*, *D. femoratus* has not been reported doing any damage to crops in Britain, however its larvae are so similar to those of *D. febrilis* that the two species may well have been confused in the larval stage. Like *D. febrilis*, adults of *D. femoratus* are often found at umbellifer flowers, and may be particularly numerous in the flowers of yellow flag (*Iris pseudacorus*). The species is often abundant among beach vegetation, as reflected in the many records from islands around Scotland.

Distribution in Scotland. The species has been recorded from all over Scotland. Since it is quite small it is easily overlooked if it is present in small numbers, though it often has conspicuous mass gatherings on flowers. Interestingly, the species has been recorded from a number of small and remote islands (e.g., St. Kilda, Flannan Isles). It is one of just two bibionid species recorded from Shetland, which makes sense since it is also the only species of the genus known from the Faroes (PEDERSEN 1971).

Vice-county records: 72, 74, 75, 76, 78, 80, 82, 83, 85, 88, 92, 96, 99, 102, 103, 104, 106, 108, 110, 112.

Dilophus humeralis ZETTERSTEDT, 1850

(Map 10)

General description. A small to medium-sized bibionid, habitually similar to *D. femoratus*. The male can be recognised on its slender gonostylus (FREEMAN & LANE 1985: fig. 7), the female on its short head (FREEMAN & LANE 1985: fig. 5) and brownish tinge of the wing membrane.



11	12
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Maps 11, 12: Records of bibionid species in Scotland. – 11: *Dilophus febrilis* (LINNAEUS); – 12: *Dilophus femoratus* MEIGEN.

Biology. Little specific information is available on the biology of this species, which is often found together with *D. febrilis* but in much smaller numbers. It is probably bivoltine like *D. febrilis* (HAENNI 1982).

Distribution in Scotland. There is a single record from Highland, Nethy Bridge in the NESBReC database. We have not been able to confirm this record. Its presence in Scotland is not implausible but misidentifications are frequent for *Dilophus* specimens so it would need confirmation. The species was described from southern Sweden (HAENNI 1982), where it has been found at approximately the same latitude as the Scottish locality (ÖSTBERG 1992).

Vice-county record: 96.

Discussion

Further possibly Scottish species

As currently recognised, 14 species of bibionids have been recorded from Scotland. This compares with 18 species from England [20 species listed by FREEMAN & LANE (1985), two of which were synonymised with other species by SKARTVEIT (2006), 12 species from Ireland (D'ARCY BURT & CHANDLER 1987), one later synonymized] and 17 species from Norway (SKARTVEIT 1995, 1996a).

In addition to the species discussed here, FREEMAN & LANE (1985) listed British records for *Bibio anglicus* VERRALL, 1869 and *Bibio hortulanus* (LINNAEUS, 1758). Both were reported only from the southern part of England and their occurrence in Scotland seems not very likely. *Bibio hortulanus* does, however, occur as far north as southern Sweden, so the chance of it being Scottish cannot be ruled out. On the other hand, several species that have a northern/alpine distribution in Scandinavia might possibly occur in Scotland's highest

Table 1: Flight periods for adult Bibionidae in Scotland. Abbreviations: **I** = January; **II** = February; **III** = March; **IV** = April; **V** = May; **VI** = June; **VII** = July; **VIII** = August; **IX** = September; **X** = October; **XI** = November; **XII** = December.

Species /	Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Total months
<i>Bibio</i>														8
<i>B. clavipes</i> MEIGEN														4
<i>B. ferruginatus</i> (LINNAEUS)														2
<i>B. johannis</i> (LINNAEUS)														3
<i>B. lanigerus</i> MEIGEN														2
<i>B. leucopterus</i> MEIGEN														4
<i>B. longipes</i> LOEW														2
<i>B. marci</i> (LINNAEUS)														3
<i>B. nigriventris</i> HALIDAY														5
<i>B. pomonae</i> (FABRICIUS)														6
<i>B. varipes</i> MEIGEN														4
<i>B. venosus</i> MEIGEN														1
Total species per month for <i>Bibio</i>		2	6	9	6	4	3	3	3	3				–
<i>Dilophus</i>														10
<i>D. bispinosus</i> LUNDSTRÖM														1
<i>D. febrilis</i> (LINNAEUS)														10
<i>D. femoratus</i> MEIGEN														3
Total species per month for <i>Dilophus</i>	1	1	2	2	2	2	2	2	1	1	1	1	1	–
Total species per month for Bibionidae	1	2	7	11	8	6	5	4	4	4	1	1	1	–

mountains, such as the Cairngorms and the Ben Nevis area. In particular, there seems to be suitable habitats for *Bibio brunnipes* (FABRICIUS, 1794), *B. siebkei* MIK, 1887 and *Dilophus borealis* SKARTVEIT, 1993. *Bibio brunnipes* is a medium-sized species most easily recognized by its brownish-yellow wings (FITZGERALD & SKARTVEIT 1997), which is commonly found in rather wet situations above the timberline, such as willow thickets, wet flushes and along the sides of lochs and rivers. *Bibio siebkei* is medium-sized and occurs in rather dry situations, commonly above the upper limit of continuous vegetation (FITZGERALD & SKARTVEIT 1997). It is frequently found around mountain summits but may also occur in lichen heaths. *Dilophus borealis* resembles *D. femoratus* but is smaller and more slender. It seems to be an upland grassland species but has also been recorded from woodlands in the north. All three of these species may be found in August.

The Scottish bibionid fauna

None of the species we have recorded are unique to Scotland in a British context – all occur in England (FREEMAN & LANE 1985) and all except the rare species *Dilophus bispinosus*, *Bibio ferruginatus* and *B. venosus* have also been recorded from Ireland (D'ARCY BURT & CHANDLER 1987). On the other hand, the upland species *Bibio nigriventris* and particularly *B. pomonae* seem to be more common in Scotland than in other parts of Britain and could be considered a northern fauna element in a British context. A number of species are southern species extending their distribution to the south (and particularly south-west) of Scotland. Thus *Bibio lanigerus*, *B. leucopterus*, *B. johannis*, *B. marci* and probably also *Bibio ferruginatus*, *B. venosus* and *Dilophus bispinosus* have mainly southern/western distributions in Scotland. This is in accordance with their distributions in Norway (SKARTVEIT 1995), where, if they occur at all, they are limited to the very southern-most part of the country. These species do not generally occur in upland situations, the only exception is the records of *B. lanigerus* from Aviemore, Highland. *Bibio varipes* and *Dilophus febrilis* are more generally distributed in Scotland but are not found at high altitudes. Their distribution in Scotland may be limited by the extent of woodland and farmland, respectively. *Bibio longipes* and *B. pomonae* are mostly found in heathlands and moorlands and their distribution seems to follow these landscape types.

In a Holarctic perspective *Bibio longipes* is the only species found in Scotland, which is known to have a Holarctic (amphi-Atlantic) distribution (SKARTVEIT 2006), although the genus *Dilophus* has not been investigated in this respect. *Bibio pomonae* has a very wide distribution in northern areas, with closely related species in North America (FITZGERALD & SKARTVEIT 1997), and *B. clavipes* also occurs at least as far East as Mongolia (SKARTVEIT, pers. observation). The remaining species found in Scotland are essentially European, although *Bibio marci* also occurs in North Africa (KRIVOSHEINA 1986) and *Dilophus bispinosus* has been recorded from Israel (SKARTVEIT & KAPLAN 1996).

May appears to be the month in which the most species of Bibionidae will be found in flight (eleven species) building up from March and April and trailing off from August to October, with the exception that *Dilophus febrilis* is almost ubiquitous (Table 1) over ten to eleven months of the year. Most other species demonstrate a much shorter flight period over two to four months.

Appendix

List of records

The papers published by Percy GRIMSHAW generally do not give the number of specimens collected, hence no numbers of specimens are given for these records unless we have found museum material corresponding to the records. The same applies to the records given by SKIDMORE (2008, 2009).

***Bibio clavipes* MEIGEN, 1818 – Records:** SCOTLAND: **Outer Hebrides:** Tarbert, Harris, ix.1882, C. W. DALE (GRIMSHAW 1914). **Highland:** Brora, Sutherland, 58°00'N 03°50'W, 20.viii.1899, G. H. VERRALL, 1 ♂ (NHML); Flowerburn, Fortrose, 57°30'N 04°10'W, 6.ix.1920, W. R. O. GRANT, 1 ♂ (NHML); Glenmore, 19–22.ix.1970, E. A. FONSECA, 5 ♂♂ (NHML); Nethy Bridge (NESBReC); Aviemore, NH9013, 17.viii.1952 and 5.ix.1970, 6 ♂♂ 3 ♀♀ (NHML); Lairig Ghru, NN9798, 12–14. ix.1970, E. A. FONSECA, 1 ♂ (NHML); Slochd, 23.ix.1962, 1250 feet, E. C. PELHAM-CLINTON, 1 ♂ (NMSE). **Argyll and Bute:** Bonawe near Taynuilt, NN0134, viii.1919, J. WATERSTON, 2 ♂♂ (NHML). **Fife:** Dumbarnie Links Wildlife Reserve,

NO4302, 16.ix.2002, G. B. CORBET, 1 ♂ swept from bracken. **Perth and Kinross:** Auchterarder, 18.viii.1948, D. J. JACKSON, 1 ♀ (NMSE); Kinfrauns Wood, 22.viii.1896, Wylie (GRIMSHAW 1899); Fenderbridge, ix.1898, EVANS (GRIMSHAW 1899). **West Dunbartonshire:** Bonhill, 19.viii.1905, 17–25.viii.1906, 16.ix.1906 and 7.ix.1907, J. MALLOCH, 6 ♂♂ 3 ♀♀ and 1 ex. (NMSE). **West Lothian:** Kirkliston, 22.viii.1940, D. K. KEVAN, 2 ♂♂ (NMSE); Dalmeny Estate, NT158796, Vc84, 31.viii.1998, D. GARNER & H. YOUNG, broadleaved trees, 1 ♂ AH223 (NMSE). **City of Edinburgh:** Granton's Disused Railway, NT233772, 22.ix.1998, B. SAVILLE, Elder/Hawthorn, 1 ♂ AH244 (NMSE); SWT Garden Survey 1998, 1 ♂ AH145-B (NMSE); SWT Garden Survey, 1998, 1 ♂ AH150-B (NMSE); Blackford Hill, NT2570, 29.vii.1997, A. E. WHITTINGTON, 3 ♂♂ (NMSE); Blackford, 12–13.x.1979, K. P. BLAND, 1 ♂ (NMSE); Dalry Park, NT237726, 30.vii.2000, B. SAVILLE, 1 ♂ AH324 (NMSE); Dalry Park, NT237726, 6–8.viii.2000, B. SAVILLE, 3 ♀♀ AH326 (NMSE); Newhailes Estate, NT3272, 19.ix.1998, D. SIVELL, Woodland, 1 ♂ AH243 (NMSE). **Midlothian:** Milton Bridge, 15.ix.1951, 1600 GMT, E. C. PELHAM-CLINTON, 1 ♂ (NMSE); Sheppath Glen, NT707708, 12.x.1998, C. BROWNE, leaf litter, 1 ♂ AH251 (NMSE). **East Lothian:** Aberlady, 17.viii.1896, W. E. CLARKE, (GRIMSHAW 1903); North Berwick, 21.viii.1896, W. E. CLARKE (NMSE). **Dumfries and Galloway:** Torrs, Wigtownshire, 22.x.1983, A. B. DUNCAN, 1 ♂ (NMSE); Grove, Kirkcudbrightshire, 27.ix.1979, A. B. DUNCAN, 1 ♀ (NMSE); Dumfries, Castlehill, 23.ix.1979, A. B. DUNCAN, 1 ♀ (NMSE). **Scottish Borders:** Peebles, viii.1900, THORNLEY, 2 ♂♂ (NMSE); Selkirk, [Harehead Wood], NT434275, 12.ix.1962, 1600 GMT, E. C. PELHAM-CLINTON, 2 ♀♀ [second specimen also has “Tree Stumps” written on the label] (NMSE); Selkirk, NT434275, 12.ix.1962, A. R. WATERSTON, 1 ♂ 4 ♀♀ (NMSE); Pease Bridge, 1843, J. HARDY (GRIMSHAW 1903).

Bibio ferruginatus (LINNAEUS, 1758) – Records: SCOTLAND: **Highland:** Tongue, 58°30'N 04°30'W, 29.vi.1951, L. CHRISTIE, 1 ♀ (NHML). **Argyll and Bute:** Lismore, Kilcheran Marsh, NM8339, 1.vi.1978, P. SKIDMORE (SKIDMORE 2009). **Fife:** Dumbarnie Links Wildlife Reserve, NO4402, 30.v.2002, G. B. CORBET, 1 ♀ on lyme grass in cut.

Bibio johannis (LINNAEUS, 1767) – Records: SCOTLAND: **Highland:** Skye, Flodigarry, 22.iv.1959, E. A. FONSECA, 1 ♂ (NHML); Rùm, Papadil, 17.iv.1962, L. HORACEK, 1 ♂ (NHML). **Perth and Kinross:** Drumcroy Hill, NN7263, 1.v.1999, K. P. BLAND, 1 ♂ (NMSE); Almond Valley, v.1894, MCGREGOR (GRIMSHAW 1895). **Argyll and Bute:** Loch Fad, Bute, 1.v.1917, P. H. GRIMSHAW, 10 ♂♂ (NMSE). **Stirling:** Gleann nam Meann, point 1404, NN528107, 25.iv.2003, J. SKARTVEIT, 1 ♀ (NMSE). **Angus:** Glas Maol, NO1676, snowfield in 1030 m, 6.v.2006, 7.v.2006 and 23.v.2006, K. P. BLAND, 38 ♀♀ (NMSE); Glas Maol, NO167763, snow-beds 1000–1050 m, 30.v.2001, K. P. BLAND, 2 ♂♂ 6 ♀♀ (NMSE). **Fife:** Kincaig Point, NT4699, 28.iii.1998, K. P. BLAND, 5 ♂♂ 1 ♀ (NMSE); Lundinpuir Links, 2.v.1929, A. H. LATHAM, 1 ♂ (NHML); Lundin Links, 7.v.1929 and 9.v.1929, A. H. LATHAM, 2 ♂♂ 1 ♀ (NMSE); Dumbarnie Links Wildlife Reserve, NO4302, 20.iv.2002, G. B. CORBET, 1 ♀ swept from tall grass and herbs, several ♂♂ on *Aegopodium* grass and marram (NMSE); Dumbarnie Links Wildlife Reserve, NO4302 and NO4402, 12.iv.2003, G. B. CORBET, 12 ♂♂ swept from long grass and 4 ♂♂ in small swarm over path; Dumbarnie Links Wildlife Reserve, NO4302, 25.iv.2004, G. B. CORBET, 3 ♂♂; Dumbarnie Links Wildlife Reserve, NO4302, 3.v.2004, G. B. CORBET, 3 ♂♂ swept along lagoon, ditch. **West Dunbartonshire:** Bonhill, 12.v.1906, J. MALLOCH, 1 ♂ (NMSE). **West Lothian:** Linlithgow Golf Course, NS9875, between clubhouse and small quarry, 16.v.1999, D. SIVELL, 1 ♀ (DSPC); Cockleroy Hill, NS989743, grassy/stoney hillside, 25.iv.2004, D. SIVELL, 1 ♂ (DSPC). **City of Edinburgh:** Blackford Hill, 21.iv.1894, P. H. GRIMSHAW, 1 ♂ (NMSE); Figgate Park, NT299737, 2.iv.1999, D. SIVELL, 1 ♀ (DSPC); Figgate Park, NT299737, 2.iv.1999, D. SIVELL, 1 ♂ (DSPC); Fairmilehead, 15.v.1919, P. H. GRIMSHAW, 1 ♂ 2 ♀♀ (NMSE); Canal near Slateford, 23.iv.1913, W. EVANS, 1 ♂ (NMSE). **Midlothian:** Crichton Glen, 26.iv.1997, K. P. BLAND, 1 ♀ (NMSE); Glen-corse, 15.iv.1894, P. H. GRIMSHAW, 1 ♂ (NMSE). **East Lothian:** Newhailes Estate, NT326727, woodland edge, 22.iv.2004, D. SIVELL, 3 ♂♂ 1 ♀ (DSPC); Newhailes Estate, NT328729, field boundary, 12.iv.2004, D. SIVELL, 1 ♂ (DSPC); Newhailes Estate, NS989743, grassy/stoney hillside, 25.iv.2004, D. SIVELL, 1 ♂ (DSPC); Newhailes Estate, NT3272, 19.ix.1998, D. SIVELL, woodland, 1 ♂ AH243 (NMSE); Kidlaw Dam, NT511641, Vc82, 22.iv.1998, A. BATTY, 1 ♂ AH171 (NMSE); Dunglass, The Factors House, NT763722, 27.iv.1997, 70 m, A. E. WHITTINGTON, 2 ♀♀ (NMSE); Gullane, 3.v.1895, P. H. GRIMSHAW, 9 ♂♂ (NMSE); Gullane, Vc82, 7.v.1955, [collector unknown, but looks like A. H. LATHAM's hand writing], 1 ♂ (NMSE); Aberlady, 3.v.1895, P. H. GRIMSHAW (GRIMSHAW 1903). **North Ayrshire:** Arran, Glen Rosa, NR980405, 4.v.2002, J. SKARTVEIT, 2 ♂♂ 1 ♀ (NMSE). **East Ayrshire:** Stair, NS438230, 18.iv.2004, J. SKARTVEIT, 7 ♂♂ (NMSE). **South Ayrshire:** Auchincruive, NS385235, 4.iv.2002, 7.iv.2002 and 13.iv.2002, J. SKARTVEIT, 7 ♂♂ (NMSE). **Dumfries and Galloway:** Torrs, Wigtownshire, 28.iv.1983, A. B. DUNCAN, 9 ♂♂ (NMSE); Mabie, 17.v.1896, R. SERVICE, 1 ♂ (NMSE). **Scottish Borders:** Hairneylaw South, near Sourhope, NT845205, 19.iii.2003, D. MCCracken, 6 larvae (NMSE).

Bibio lanigerus MEIGEN, 1818 – Records: SCOTLAND: **Highland:** Skye, Flodigarry, 22.iv.1959, W. DAVIDSON, 1 ♀ (NHML); Rùm, Harris Moor, 17.iv.1962, L. HORACEK, 1 ♂ (NHML); Rùm, Kinloch, 16–18.iv.1962, L. HORACEK, 2 ♂♂ (NHML); Eigg, Cleadale, NM477880, 28.v.1970, A. M. HUTTON, 2 ♂♂ (NHML); Eigg, Gurr, 10.iv.1969, A. M. HUTTON, 1 ♂ (NHML); Muck, no details (SKIDMORE 2009); W. Ross, Inver Alligin, 57°30'N 05°40'W, 23–24.iv.1962, L. HORACEK, 1 ♂ (NHML);

W. Ross, Kinlochewe, 57°35'N 05°20'W, 23.v.1902, W. D. O. GRANT, 1 ♂ (NHML); Aviemore, NH9013, 25.v.1913, Lt. Col. YERBURY, 1 ♂ (NHML); Aviemore, NH9013, 25.iv.1959, W. DAVIDSON, 1 ♂ (NHML). **Moray:** Culbin Sands, v.1922, J. W. MUNRO, 2 ♂♂ (NHML); Carron, 26.v.1899, H. H. BROWN (in GRIMSHAW collection), 1 ♀ (NMSE). **Aberdeenshire:** Strachan, 25.v.2006, K. P. BLAND, 1 ♂ (NMSE). **Perth and Kinross:** Drochaid na h-Uinneige near Clunes House, Calvine, NN7866, 1.v.1999, K. P. BLAND, 7 ♂♂ (NMSE); Fealar Gorge (lower), NN9979, 29.ix.2002, K. P. BLAND, 1 ♀ (NMSE); Methven Moss, iv.1894, MCGREGOR (GRIMSHAW 1895); Minkie Moss, iv.1894, MCGREGOR (GRIMSHAW 1895). **Angus:** Glas Maol, NO1676, 4.v.1998, 1000 m, K. P. BLAND, 2 ♀♀ (NMSE); Glas Maol summit, NO1576, 950–1000 m on snow beds, 30.v.2001, K. P. BLAND, 1 ♀ (NMSE); South side of Craig Mellon, 450 m, NO2676, 56°52'N 03°11'W, 25.iv.1998, K. P. BLAND, 1 ♂ (NMSE). **Stirling:** Aberfoyle, iv.1896, W. EVANS (GRIMSHAW 1899). **Argyll and Bute:** Ardgarten, 26.iv.1973, J. P. DEAR, 8 ♂♂ (NHML); Loch Fad, Bute, 1.v.1917, [P. H. GRIMSHAW], 1 ♂ (NMSE); NW of Ardmaleish, Bute, 3.v.1917, P. H. GRIMSHAW, 1 ♂ (NMSE). **Fife:** Lundin Links, 20.v.1929, A. H. LATHAM, 1 ♂ (NMSE); Tayport, Tentsmuir N. N. R., 23.v.1970, E. C. PELHAM-CLINTON, 4 ♂♂ (NMSE); St Andrews, reared from pupa, 2.iv.1946, [collector unknown], 1 ♀ (NMSE). **West Dunbartonshire:** Bonhill, 24.iv.1905 and 13.v.1905, J. MALLOCH, 4 ♂♂ (NMSE). **West Lothian:** Cockleroy Hill, NS989743, grassy/stony hillside, 25.iv.2004, D. SIVELL, 2 ♂♂ (DSPC). **City of Edinburgh:** Stanley Street, NT305733, 14.iv.1999, D. SIVELL, 1 ♂ (DSPC); Braid Hills, 13.v.1913, W. EVANS, 1 ♂ (NMSE); Blackford Hill, 21.iv.1894 and 12.v.1895 (GRIMSHAW 1903); Blackford Hill, 25.iv.1904, J. WATERSTON (in GRIMSHAW collection), 2 ♂♂ (NMSE); Blackford Hill, 28.iv.1908, W. EVANS, 1 ♂ (NMSE); Blackford Hill, NT2570, 2.v.1995, 30.iv.2000 and 4.v.2002, K. P. BLAND, 4 ♂♂ (NMSE). **Midlothian:** Dewar, NT3447, 1.v.2004, K. P. BLAND, 1 ♀ (NMSE); Fullarton Water, NT2856, 8.v.1998 and 9.v.1998, K. P. BLAND, 6 ♂♂ (NMSE). **East Lothian:** Gullane Links, NT4683, 28.iv.2002, K. P. BLAND, 5 ♂♂ (NMSE); N of Nether Brotherstone, NT4355, 13.iv.1998, K. P. BLAND, 3 ♂♂ (NMSE); Traprain Law, NT5774, 1.v.2000, K. P. BLAND, 3 ♂♂ (NMSE). **North Ayrshire:** Arran, 3.iv.1952, C. H. ANDREWES, 1 ♂ 1 ♀ (NHML). **North Lanarkshire:** Bishop Loch, near Coatbridge, 5.v.1899, G. W. ORD, 1 ♂ (NMSE). **South Ayrshire:** Auchincruive, NS385235, 13.iv.2002, 24.iv.2002 and 1.v.2002, J. SKARTVEIT, 34 ♂♂ 2 ♀♀ (NMSE). **Dumfries and Galloway:** Torrs, Wigtownshire, 15.v.1982, 28.iv.1983, 19.v.1983 and 13.v.1984, A. B. DUNCAN, 11 ♂♂ (NMSE); Palnackie, 9.v.1982, A. B. DUNCAN, 1 ♂ (NMSE); Caerlaverock, 2.v.1980, A. B. DUNCAN, 2 ♂♂ (NMSE); Rockcliffe, 21.iv.1982, A. B. DUNCAN, 10 ♂♂ (NMSE); Auchenfad, 10.v.1981, A. B. DUNCAN, 3 ♂♂ 1 ♀ (NMSE); Tynron, 9.v.1954, A. B. DUNCAN, 1 ♂ (NMSE); Kippford, 21.iv.1982, A. B. DUNCAN, 5 ♂♂ 1 ♀ (NMSE); Lochar Bridge, 4.v.1981, 23.iv.1982, 29.iv.1982, 7.v.1982 and 12.v.1983, A. B. DUNCAN, 17 ♂♂ 5 ♀♀ (NMSE); Cample Cleugh, 25.iv.1896, R. SERVICE, 1 ♂ (NMSE). **Scottish Borders:** Craighburn, NT2354, 9.v.1997, K. P. BLAND, 4 ♂♂ (NMSE).

Bibio leucopterus (MEIGEN, 1804) – Records: SCOTLAND: **Highland:** Loch Fleet, NH7995, 26.v.2002, P. CHANDLER, 2 ♂♂; Strathpeffer, NH478574, 9.v.2011, M. MACDONALD, 1 ♂ (NMSE); Easter Ross, Loch Eye, NH8480, 26.v.2002, P. CHANDLER, 1 ♂; Udale Bay, NH7165, 29.v.2002, P. CHANDLER, 1 ♀; Skye, Armadale Castle Grounds, NG6405, 31.v.1995, P. SKIDMORE (SKIDMORE 2009); Skye, Broadford Forest, NG6326, 27.v.1992, P. SKIDMORE (SKIDMORE 2009); Mull, Laggan Bay, NM4541, upper end of beach, 28.v.1991, P. SKIDMORE (SKIDMORE 2009). **Aberdeenshire:** Turriff, Forglen Estate, 11.vi.1994, A. E. WHITTINGTON, 1 ♀ (NMSE). **Perth and Kinross:** Almond Valley, iv.1894, MCGREGOR (GRIMSHAW 1895); Torry Bay, 6.vi.2001, B. LITTLE, 1 ♂ (NMSE). **Argyll and Bute:** Lochgilphead, 6.vi.1942, A. H. LATHAM, 1 ♂ (NMSE); Lismore, Kilcheran Marsh, NM8339, 1.vi.1978, P. SKIDMORE (SKIDMORE 2009). **Stirling:** Brig o'Turk, NN535065, 22.v.2002, J. SKARTVEIT, 1 ♂ (NMSE). **Fife:** Dumbarnie Links Wildlife Reserve, NO4402, 23.v.2004, G. B. CORBET, 1 ♂ swept from ditch. **West Dunbartonshire:** Bonhill, 28.v.1904, 2.vi.1906, 9.vi.1906, 22.vi.1906 and 25.v.1907, J. MALLOCH, 2 ♂♂ 7 ♀♀ (NMSE). **Renfrewshire:** 'Old Manse' Kilbrachan, Renfrewshire, 7.vi.1947, F. J. RAMSAY, swept from rough herbage, 1 ♂ 2 ♀♀ (NMSE). **West Lothian:** Linlithgow Golf Course, NS9875, between clubhouse and small quarry, 16.v.99, D. SIVELL, 1 ♂ (DSPC). **City of Edinburgh:** Arthur's Seat, NT282737, streamside vegetation, 15.v.1999, D. SIVELL, 1 ♂ 1 ♀ (DSPC); Hermitage of Braid, NT250702, woodland, 30.v.1999, D. SIVELL, 1 ♂ (DSPC); Meadowfield Community Woodland, NT23584734, woodland edge, 15.v.1999, D. SIVELL, 1 ♀ (DSPC). **Midlothian:** Old Pentland Cemetery, NT2666, 16.v.2004, K. P. BLAND, 1 ♂ (NMSE); Arniston forest, NT323593, 26.v.1995, 130 m, A. E. WHITTINGTON, 1 ♂ 1 ♀ (NMSE); Blackburn, Penicuik, NT2358, 21.v.2005, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Crichton Glen, NT3761, 23.v.1998, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Glencorse 5.x.1908, J. WATERSTON, numerous ♂♂ (GRIMSHAW 1920). **East Lothian:** Stenton Village, NT6274, 100 m, 20.v.2003, A. E. WHITTINGTON, 1 ♂ (NMSE); Dunglass, The Factors House, NT763722, 70 m, 25.v.1997 and 30.v.1997, A. E. WHITTINGTON, 1 ♂ and 1 ♂ 1 ♀ in copula (NMSE). **North Ayrshire:** Arran, Brodick, Strathwhillan, NS023356, 14.v.2004, J. SKARTVEIT, 1 ♂ (NMSE). **East Ayrshire:** Loch Trabboch, NS435218, 17.v.2003, J. SKARTVEIT, 7 ♂♂ 4 ♀♀ (NMSE). **Scottish Borders:** Threepwood Moss, Roxburghshire, NT5142, 4.vi.1998, K. P. BLAND, 1 ♂ (NMSE). **South Ayrshire:** Auchincruive, NS385235, 8.v.2002, 11.v.2002, 12.v.2002 and 18.v.2002, J. SKARTVEIT, 7 ♂♂ 4 ♀♀ (NMSE). **Dumfries and Galloway:** Logan, Wigtownshire, 17.v.1983, A. B. DUNCAN, 1 ♂ 1 ♀ (NMSE); Torrs, Wigtownshire, 19.v.1983, A. B. DUNCAN, 1 ♂ (NMSE); Collochan Loch, Vc72, 14.v.1980, A. B. DUNCAN,

1 ♂ (NMSE); Tynron, 19.v.1945 and 27.v.1945, A. B. DUNCAN, 2 ♀♀ (NMSE). **Scottish Borders:** Lochur Marsh, NT1041, 22.v.2004, K. P. BLAND, 1 ♀ (NMSE); Pease Bridge, 1843, J. HARDY (GRIMSHAW 1903).

Bibio longipes LOEW, 1864 – **Records:** SCOTLAND: **Highland:** W. Inverness, Camas Rubh a Mhurein NM6501, 19.x.2001, P. SKIDMORE (SKIDMORE 2009); Muck, no details (SKIDMORE 2009); Rùm, no details (SKIDMORE 2009); Mull, Kinloch Castle Grounds NM4096 (SKIDMORE 2009); Eilean Ron, Sutherland, ix.1950, C. H. ANDREWES, 4 ♂♂ and 1 ex. (NHML) [label hard to read]; Glenmore, 19–22.ix.1970, E. A. FONSECA, 1 ♂ (NHML); Aviemore NH9013, 4.x.1950, C. H. ANDREWES, 1 ♂ (NHML); Loch Laggan, 5.x.1945, D. J. JACKSON, flying on moor, 6 ♂♂ (NMSE); Loch Ba, Mull, Vc103, 3–5.x.1907, N of Annandale, [in GRIMSHAW collection], 1 ♂ (NMSE); near Elphin, Creag a'Chnocain, NC187092, 18.x.2007, A. E. WHITTINGTON, 1 ♂ (NMSE). **City of Aberdeen:** Aberdeen, 1894, J. W. DUNCAN [in GRIMSHAW collection], 2 ♂♂ (NMSE). **Aberdeenshire:** Don, 7.v.1896, R. SERVICE, 1 ex. (NMSE); Glen Lui at Linn of Dee (NESBReC). **Perth and Kinross:** Creag an Lochain, NN591410, 550 m, 21.x.1995, herb rich gully, A. E. WHITTINGTON, 2 ♂♂ (NMSE); Beinn Ghlas, Lawers, 1100 m, 12.x.1999, K. P. BLAND, 1 ♂ (NMSE); Beinn Ghlas, NN625407, 950 m, 14.x.1995, A. E. WHITTINGTON, 5 ♂♂ (NMSE); Pitlochry, summit of Ben Vrackie, 841 m, NN951633, 11.x.2003, J. SKARTVEIT, 1 ♂ (NMSE); Fealar Gorge (lower), NN9979, 27.ix.1999, K. P. BLAND, 11 ♂♂ 1 ♀ (NMSE); Fealar Gorge, NO0079, 1.x.1998, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Fealar Gorge, NO0078, 25.ix.1997, K. P. BLAND, 6 ♂♂ 2 ♀♀ (NMSE); Fealar, NN9974, 6.x.2000, K. P. BLAND, 5 ♂♂ (NMSE); Fealar, NO0075, 22.ix.1997, K. P. BLAND, 1 ♂ (NMSE); Gleann Mór Bridge, NO0077, 22.ix.1998, K. P. BLAND, 1 ♂ (NMSE); Glen Beag Bridge, NO0078, 27.ix.2002, K. P. BLAND, 1 ♂ (NMSE); Allt Féith Làir, NO0180, 23.xi.1998, K. P. BLAND, 10 ♂♂ (NMSE); Allt Féith Làir, NO0180, 17.x.–18.xi.1999, K. P. BLAND, 1 ♂ (NMSE); Wade Stone, 19.x.1996, K. P. BLAND, 1 ♂ (NMSE); Meall Odhar, 850 m, NO1577, 14.x.2006, K. P. BLAND, 3 ♂♂ (NMSE); Glen Fender, 21.x.1996, K. P. BLAND, 6 ♂♂ 1 ♀ (NMSE); Allt Garbh Buidhe, 28.ix.1999, K. P. BLAND, 5 ♂♂ 2 ♀♀ (NMSE); Almond Valley, v.1894, MCGREGOR (GRIMSHAW 1895); Almond Valley, v.1899, T. M. M. GREGOR, 1 ♂ (NMSE); Dunkeld, Heritage, 15.v.2006, A. E. WHITTINGTON, 1 ♂ (NMSE); Dunkeld, 1.vi.1946, [collector unknown], 1 ♀ (NMSE); Perth, 12.v.1953, [collector unknown], 1 ♀ (NMSE); Strathday, 16.v.1914, M. M. WILSON, 4 ♂♂ (NMSE); River Lyon, 23.v.1920, J. W. BOWHILL, 1 ♂ (NMSE); Summit of Meall nan Tarmachan, 22.viii.2002, K. P. BLAND, 2 ♂♂ (NMSE). **Fife:** Dumbarnie Links Wildlife Reserve, NO4302, 16.ix.2002 and 26.ix.2002, G. B. CORBET, 1 ♀ swept from bracken, 1 ♀ from grass and 2 ♂♂ 1 ♀ on sycamore; Dumbarnie Links Wildlife Reserve, NO4302 and NO4402, 6.ix.2003, 26.ix.2003 and 26.x.2003, G. B. CORBET, 4 ♂♂ swept from grass, 3 ♂♂ from tall herbs and 2 ♂♂ on foredune; Kincraig Point, NT4699, 5.v.2001, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); **Argyll & Bute:** Seil, near Atlantic Bridge, NM7820, wooded area 17.x.2001, P. SKIDMORE (SKIDMORE 2009); Mid-Argyll district of Argyllshire, 800 feet, from pheasant's crop, 2286 ex., H. L. MACDONALD (GRIMSHAW 1912). **City of Edinburgh:** Kirk Burn, Pentland Hills, NT218654, 14.ix.98, D. SIVELL, 1 ♂ (DSPC); Edinburgh, 2.x.1934, A. H. LATHAM, 1 ♂ (NMSE); Bonally, 600 feet, 7.x.1954, E. C. PELHAM-CLINTON, swept, 5 ♂♂ 2 ♀♀ (NMSE). **Midlothian:** Miltonbridge, 1400 GMT, suction trap, 7.x.1951 and 19.x.1951, E. C. PELHAM-CLINTON, 2 ♂♂ (NMSE); Miltonbridge, trap no. 41, 23.x.1952, R. O. DARWISH [in E. C. PELHAM-CLINTON collection], 1 ♂ (NMSE). **East Lothian:** Pressmennan Wood, NT6272, forest trail 150–200 m, 14.x.2003, A. E. WHITTINGTON, 1 ♂ (NMSE). **Dumfries and Galloway:** Torrs, Wigtownshire, 21.x.1983 and 22.x.1983, A. B. DUNCAN, 19 ♂♂ 3 ♀♀ (NMSE); Carrifran Glen, 23.ix.–22.x.2000, K. P. BLAND, 3 ♂♂ (NMSE); Grove [hill, near Closeburn, NX8695], 27.ix.1979, A. B. DUNCAN, 1 ♂ (NMSE).

Bibio marci (LINNAEUS, 1758) – **Records:** SCOTLAND: **Highland:** Cromarty, Dingwall, 28.v.1911, Lt. Col. YERBURY, 1 ♂ 1 ♀ (NHML); Black Isle, Janefield, 15.iv.1894 and 19.iv.1895, R. SERVICE, 2 ♂♂ (NMSE); Aviemore (NESBReC); Kingussie (NESBReC). **Aberdeenshire:** Cruden Bay NE Ellon (NESBReC); Ballater (NESBReC). **Angus:** Hill of Finavon, NO5055, 8.vi.1996, K. P. BLAND, 1 ♂ (NMSE); Roscobie Loch, NO5251, 8.vi.1996, K. P. BLAND, 4 ♂♂ (NMSE). **Stirling:** Flanders Moss NNR, South Flanders, NS6297, 5.vi.1997, K. P. BLAND, 5 ♂♂ 1 ♀ (NMSE); Denny Hills shooting estate, from partridge crop, 15.x.1912, Dr HARVIE-BROWN, “thousands” of specimens (EVANS 1912). Dumbarnie Links Wildlife Reserve, NO4402, 28.iv.2000 and 10.v.2000 (1 ♂), G. B. CORBET, abundant; Dumbarnie Links Wildlife Reserve, NO4302 and NO4402, 21.v.2002, G. B. CORBET, widespread, c.20 lethargic on cut *Alliaria* [4 ♂♂ examined]; Dumbarnie Links Wildlife Reserve, NO4302 and NO4402, 2.v.2003 and 13.v.2003, G. B. CORBET, 1 ♂ on *Taraxacum*, 1 ♂ on *Prunus* leaf and 2 ♂♂ swept from foredune; Dumbarnie Links Wildlife Reserve, NO4302 and NO4402, 3.v.2004, G. B. CORBET, 1 ♂ swept from ditch; Dumbarnie Links, NN4402, 10.v.2000, K. P. BLAND, 1 ♂ 1 ♀ in copula (NMSE). **West Lothian:** Linlithgow golf course, NS989760, Vc84, 16.v.1999, B. SAVILLE, Rowan, 1 ♀ AH259 (NMSE); Linlithgow Golf Course, NS9875, 16.v.1999, D. SIVELL, 1 ♀ (DSPC); Linlithgow Golf Course, NS9875, 16.v.1999, K. P. BLAND, 3 ♂♂ 1 ♀ (NMSE); Easter Inch Moss, NT003665, Vc84, 16.v.1999, R. MARR, 1 ♂ AH173 (NMSE); Easter Inch Moss, NT003665, Vc84, 16.v.1999, R. MARR, 1 ♂ AH173 (NMSE). **City of Edinburgh:** North of Blackford Hill, NT2571, 30.iii.1997, K. P. BLAND, communal larvae in garden soil (reared and retained), 2L, 3p, 2 exuviae, 3 ♂♂ 2 ♀♀ (NMSE); Blackford Hill, NT2570, 4.v.2002, K. P. BLAND, 1 ♀ (NMSE); Blackford, NT2571, 3.v.1998, K. P. BLAND, 1 ♂ (NMSE); Edinburgh, 1998, SWT Garden Survey, 1 ♂ AH105-B (NMSE); Arthur's Seat, NT282737, streamside vegetation, 15.v.1999, D. SIVELL, 1 ♂ 1 ♀ (DSPC); Cavalry Park, NT288724, open woodland,

30.v.1999, D. SIVELL, 1 ♀ (DSPC); Hermitage of Braid, NT250702, woodland, 30.v.1999, D. SIVELL, 1 ♀ (DSPC); Meadowfield Community Woodland, NT284734, 15.v.1999, D. SIVELL, 1 ♂ 1 ♀ (DSPC); Corstorphine, 24.vi.1917, J. W. BOWHILL, 1 ex. (NMSE); Edinburgh, 6.v.1904, [collector unknown], 1 ♂ (NMSE). **Midlothian:** Toxsidehill Moss, NT2954, 1.vi.1997, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Old Pentland Cemetery, NT2666, 16.v.2004, K. P. BLAND, 1 ♂ (NMSE); Blackburn, Penicuik, NT2358, 21.v.2005, K. P. BLAND, 1 ♂ (NMSE). **East Lothian:** Gullane Links, NT4683, 28.iv.2007, K. P. BLAND, 2 ♂♂ (NMSE); Gullane, 18.v.1953, E. C. PELHAM-CLINTON, 2 ♂♂ (NMSE); Dunglass, The Factors House, NT763722, 7.v.1997 and 25.v.1997, 70 m, A. E. WHITTINGTON, 2 ♂♂ 1 ♀ (NMSE); Innerwick School grounds, NT7274, 8.v.1997, K. E. WHITTINGTON, 1 ♂ 1 ♀ in copula (NMSE); Innerwick School grounds, NT7274, 10.v.1997, K. E. WHITTINGTON, on Hawthorn flowers, 3 ♂♂ (NMSE); Tynninghame, 10.v.1913, A. B. BALFOUR (in EVANS collection), off *Lamium album*, 1 ♂ (NMSE); Tynninghame, Sandy Hirst, sea level, NT635800, 19.v.2002, A. E. WHITTINGTON, 4 ♂♂ (NMSE); Whittinghame, 24.v.1913, W. EVANS, 1 ♀ (NMSE); Stenton Village, NT6274, 14–27.v.2002, 100 m, A. E. WHITTINGTON, 3 ♂♂ 3 ♀♀ (NMSE); Dunbar, v.1979, H. WHITEHEAD, 36671791, off washing, [in Edinburgh Natural History Society collection], 1 ♂ (NMSE); Dunbar, NT6684, 16.v.2010, A. E. WHITTINGTON, 1 ♂ (NMSE); Tantallon Castle, upper parapet approx. 30 m, NT5985, 3.vi.2001, A. E. WHITTINGTON, 1 ♂ 2 ♀♀ (NMSE); Barnness, NT7277, 17.v.1997, K. P. BLAND, 3 ♂♂ (NMSE); Traprain, 24.v.1913, W. EVANS, 2 ♂♂ (NMSE). **North Ayrshire:** Arran, Lower Glen Rosa, NS000375, 4.v.2002, J. SKARTVEIT, 2 ♂♂ (NMSE); Arran, Brodick, Glen Cloy, NS005357, 13.v.2004, J. SKARTVEIT, 1 ♂ (NMSE); Glengarnock, Vc75, NS3253, 28.v.1944, J.A. MALCOLM, 1 ♂ 1 ♀ (NHML). **East Ayrshire:** Stair, NS440235, 4.v.2003, J. SKARTVEIT, 1 ♂ 1 ♀ (NMSE). **South Ayrshire:** Auchincruive, NS385235, in leaf litter, 23.iii.2002, J. SKARTVEIT, ca. 20 larvae (NMSE); Auchincruive, NS385235, 1.v.2002, J. SKARTVEIT, 9 ♂♂ 1 ♀ (NMSE); Auchincruive, NS385235, 6.v.2002, J. SKARTVEIT, 1 ♀ (NMSE); Auchincruive, NS385235, 7.v.2002, J. SKARTVEIT, 5 ♂♂ 1 ♀ (NMSE); Auchincruive, NS385235, 8.v.2002, J. SKARTVEIT, 2 ♀♀ (NMSE). **Dumfries and Galloway:** M[eikle] Ross, NX6543, 17.v.1972, A. B. DUNCAN, 2 ♂♂ 2 ♀♀ (NMSE); Torrs, Wigtownshire, 15.v.1982, 18.v.1983 and 19.v.1983, A. B. DUNCAN, 2 ♂♂ 3 ♀♀ (NMSE); Corsemalzie, Whauphill, v.1899, J. G. GORDON, 3 ♂♂ (NMSE); Portling, 17.v.1952, A. B. DUNCAN, 3 ♂♂ (NMSE); Caerlaverock, 30.v.1980, A. B. DUNCAN, 1 ♂ (NMSE); Kirkconnell, 13.v.1971, A. B. DUNCAN, 1 ♀ (NMSE); Closeburn, 23.v.1950, A. B. DUNCAN, 1 ♂ 1 ♀ (NMSE). **Scottish Borders:** Threepwood Moss, Roxburghshire, NT5142, 4.vi.1998, K. P. BLAND, 2 ♂♂ (NMSE); Bemersyde, 30.v.2005, K. P. BLAND, 1 ♂ (NMSE); Pease Bridge, 1843, J. HARDY (GRIMSHAW 1903).

***Bibio nigriventris* HALIDAY, 1833 – Records:** SCOTLAND: **Shetland:** no details (SKIDMORE 2009). **Orkney:** Pegal Bay, ND2997, 17.vi.2003, K. P. BLAND, 1 ♂ (NMSE); Kirkwall, [no date], J. WATERSTON, 1 ♀ (NMSE); Kirkwall, Orkney, [no date], J. WATERSTON, 1 ♀ (NMSE). **Outer Hebrides:** Lewis, Stornoway Castle, 4.vi.1962, BROOMFIELD & VARDY, 1 ♂ 1 ♀ (NHML). **Highland:** Sutherland, Inveran, 12.vii.1886, G. H. VERRALL, 1 ♂ (NHML); Sutherland, Lairg, 20.vi.1965, E. A. FONSECA, 1 ♂ (NHML); Sutherland, Tongue, 58°30'N 04°30'W, 26.vi.1951, L. CHRISTIE, 1 ♂ (NHML); Skye, Dunvegan, vi.1905, J. WATERSTON (GRIMSHAW 1914); Skye, Lub Score near Cairidh Glumaig, NG4174, 25.v.1992, P. SKIDMORE (SKIDMORE 2009); Raasay, Brae woods, NG5642, 26.v.1992, P. SKIDMORE (SKIDMORE 2009); Rùm, Guirdil, pitfall trap, v.–viii.2000, D. BEAUMONT, 1 ♂ (NMSE); Rùm, Kilmory Fank, pitfall trap, 2.vii.2000, D. BEAUMONT, 1 ♂ (NMSE); Glen Strathfarrar, native pinewood, malaise trap, viii.1988, I. MACGOWAN, 1 ♀ (NMSE); Cromarty, Dingwall, 26.v.1911, Lt. Col. YERBURY, 3 ♂♂ 2 ♀♀ (NHML); Black Isle, Janefield, 15.vi.1894 and 18.vi.1894, R. SERVICE, 3 ♂♂ 3 ♀♀ (NMSE); Glenmore, 30.v.1964, 9.vi.1967, 25.v.1971 and 2–11.vi.1971, E. A. FONSECA, 4 ♂♂ 4 ♀♀ (NHML); Kinrara, 26.v.1959, E. A. FONSECA, 1 ♂ 1 ♀ (NHML); Beinn Eighe NNR, NH0064, malaise trap, 11.v.–13.vi.1988, I. MACGOWAN, 1 ♂ 1 ♀ (NMSE); Beinn Eighe NNR, NH0064, native pinewood, malaise trap, vi.1989, I. MACGOWAN, 1 ♀ (NMSE); Cairgorm N. R., Aviemore, 19.vi.1965, E. C. PELHAM-CLINTON, 1 ♂ (NMSE); Dunachton, v.1908, P. H. GRIMSHAW, 1 ♂ (NMSE); Aviemore, NH9013, 23.v.1913, Lt. Col. YERBURY, 3 ♂♂ 3 ♀♀ (NHML); Aviemore, NH9013, 11–21.vi.1960 and 27.v.1971, E. A. FONSECA, 1 ♂ 2 ♀♀ (NHML); Aviemore (NESBReC); Abernethy Forest at Forest Lodge (NESBReC); Lairig Ghru, NN9798, 7.vi.1967, E. A. FONSECA, 1 ♀ (NHML); Loch Morlich, NH9609, 24.vi.1933, R. L. COE, 1 ♂ (NHML); Nethy Bridge, NJ0120, 10.vi.1962, E. A. FONSECA, 1 ♀ (NHML); Nethy Bridge, 24.vi.1900, Lt. Col. YERBURY [in GRIMSHAW collection], 1 ♀ (NMSE); Spey Bridge, NJ0426, 29.v.1959 and 3.vi.1962, E. A. FONSECA, 5 ♀♀ (NHML); Craigellachie, NH8912, 1.vi.1971, E. A. FONSECA, 2 ♂♂ 1 ♀ (NHML); Glen Brown, NJ1220, 10.vi.1962, E. A. FONSECA, 1 ♂ (NHML); Glenelg, 57°13'N 05°37'W, 4.vi.1962, E. A. FONSECA, 1 ♀ (NHML); Glenfeshie, NH8500, 10.vi.1967, E. A. FONSECA, 3 ♂♂ 2 ♀♀ (NHML); Newtonmore, 2.x.1945, D. J. JACKSON, 1 ♂ (NMSE); Isle of Mull, Ath Leitir on Loch Uisg, Vc103, NM543412, 27.vi.1997, degenerate alderwood, 16 m, A. E. WHITTINGTON, 1 ♂ (NMSE); Isle of Mull, Killichronan, NM6325, 27.vi.1997, 50 m, A. E. WHITTINGTON, 2 ♀♀ (NMSE). **Argyll and Bute:** Jura, Lagg, NR5979, 18.vi.1882, G. H. VERRALL, 1 ♀ (NHML); Appin, 30.v.1934, A. H. LATHAM, 1 ♀ (NMSE); Helensburgh, 17.vi.1905 and 1906, J. MALLOCH, 1 ♂ 1 ♀ (NMSE). **Aberdeenshire:** Linn of Dee (NESBReC); Morrone Hill, NO1490, 4.vi.2002, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Braemar, NO1592, 24.vi.–13.vii.1951, R. L. COE, 1 ♂ 1 ♀ (NHML); Loch Callater, NO1884, ca. 1500 feet, 26.vii.1951, R. L. COE, 1 ♂ (NHML); Balmoral Forest, NO2488, 24.vi.–13.vii.1951, R. L. COE, 1 ♀ (NHML); Glen Tanar, NO4892, native pinewood, malaise trap, v.1990, I. MACGOWAN, 1 ♂ (NMSE). **City of Aberdeen:** Aberdeen, 3.vi.1884, G. H. VERRALL, 1 ♀ (NHML).

Perth and Kinross: Almond Valley, v.1894, MCGREGOR (GRIMSHAW 1895); Woody Island, v.1894, MCGREGOR (GRIMSHAW 1895); Rannoch, NN6258, 18.vi.1870, G. H. VERRALL, 2 ♂♂ (NHML); Loch Rannoch, NN6258, vi.1931, F. W. EDWARDS, 1 ♂ 1 ♀ (NHML); Loch Rannoch, NN6258, 31.v.1967, E. A. FONSECA, 2 ♀♀ (NHML); Beinn Vorlich, NN6218, 980 m, 6.vi.2007, K. P. BLAND, 1 ♂ 2 ♀♀ (NMSE); Ben Lawers, OS 51 607396, plot 7C, *Salix arbuscula*, 1.vi.2002, R. SHAW, 1 ♀ (MLURI); Meall nan Tarmachan, 14.vi.1997, K. P. BLAND, 2 ♂♂ (NMSE); Pitlochry, Loch Tummel, NN8259, v.1913, M. E. MOSELY, 3 ♀♀ (NHML); Pitlochry, Loch Tummel, NN8259, 1–3.vi.1967, E. A. FONSECA, 3 ♂♂ 2 ♀♀ (NHML); Killin, Ben Chalum, 9–10.vi.1932, F. W. EDWARDS, 1 ♀ (NHML); Killin, Meall Ghaordie, 17.vi.1932, F. W. EDWARDS, 1 ex. (NHML); Loch Craggs, NN9874, 20.vi.1998, K. P. BLAND, 4 ♂♂ (NMSE); Fealar Gorge, NO0079, 19.vi.2000, K. P. BLAND, 1 ♂ (NMSE); Fealar Gorge, NO0079, 24–25.vi.1999, K. P. BLAND, 2 ♂♂ (NMSE); Fealar, NO0075, 6.x.2000, K. P. BLAND, 1 ♂ (NMSE); Fealar Gorge, NO0079, 17–22.vi.1998, K. P. BLAND, 1 ♂ (NMSE); Fusichan [= Ghuibhsachain], 24.vi.1999, K. P. BLAND, 1 ♂ (NMSE); The Cairnwell, 2.vii.1999, K. P. BLAND, 1 ♀ (NMSE); Birnam, near Dunkeld, 2.vi.1946, [collector unknown], 1 ♂ 1 ♀ (NMSE); Glen Almond, Amulree, 25.v.1946, D. J. JACKSON, 1 ♂ 1 ♀ (NMSE); Cardrum, 18.v.1907, J. MALLOCH, 1 ♀ (NMSE). **Angus:** Hill of Finavon, NO5055, 8.vi.1996, K. P. BLAND, 1 ♂ (NMSE); Roscobie Loch, NO5251, 8.vi.1996, K. P. BLAND, 44 ♂♂ 4 ♀♀ (NMSE). **Kincardineshire:** S of Cornmech (labelled Strachan) [by B974 just north of Cuttieshillock road end], NO6589, 25.v.2006, K. P. BLAND, 1 ♂ (NMSE); Caenlochan Craigs, NO1776, 3000 feet, by shute on top, 28.v.1997, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Caenlochan, 16.vi.2000, snowbeds, K. P. BLAND, 2 ♂♂ (NMSE); Caenlochan, 9.vii.1998, K. P. BLAND, 2 ♂♂ 2 ♀♀ (NMSE). **Clackmannanshire:** Clackmannan, v.1922, J. W. MUNRO, 2 ♂♂, bred (NHML). **Fife:** Lomond Hills, 4.vi.1997, K. P. BLAND, 2 ♂♂ 2 ♀♀ (NMSE); Aberdour, 1904, P. H. GRIMSHAW, 1 ♂ (NMSE); Lundin Links, Fife, 15.v.1929, A. H. LATHAM, 1 ♂ 1 ♀ (NMSE); Lundin Links, Fife, 30.v.1930, A. H. LATHAM, 1 ♂ (NMSE); Kinghorn, 1896, P. H. GRIMSHAW, 1 ♀ (NMSE). **West Dunbartonshire:** Bonhill, 20.iv.–17.vii.1905, J. MALLOCH, 4 ♂♂ 4 ♀♀ (NMSE); Bonhill, 2.vi.1906, J. MALLOCH, 1 ♂ (NMSE); Bonhill, 25.v.1907, J. MALLOCH, 1 ♀ (NMSE); Helensburgh, 17.vi.1905, J. MALLOCH, 1 ♂ (NMSE); Cardross, 18.v.1907, J. MALLOCH, 1 ♀ (NMSE). **East Dunbartonshire:** Milngavie, 16.vi.1899, G. W. ORD [in GRIMSHAW collection], 1 ♀ (NMSE). **West Lothian:** Linlithgow Golf Course, NS9875, 16.v.1999, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Linlithgow Golf Course, NS9875, small pond near clubhouse, 16.v.1999, D. SIVELL, 1 ♂ 1 ♀ (DSPC); Easter Inch Moss, NT003665, 16.v.1998, B. SAVILLE, Scots Pine, 1 ♂ AH170 (NMSE). **City of Edinburgh:** Bonally, 29.v.1912, P. H. GRIMSHAW, 1 ♂ 1 ♀ (NMSE); Braid Burn, 23.vi.1904, P. H. GRIMSHAW, 1 ♂ 1 ♀ (NMSE); Braid Hills, 27.v.1894, P. H. GRIMSHAW, 1 ♀ (NMSE); Edinburgh, reared from larvae from Dr RITCHIE's garden, iv.1915, P. H. GRIMSHAW, 4 ♂♂ 2 ♀♀ (NMSE); Arthur's Seat, NT278726, 15.vi.1996, 100 m, A. E. WHITTINGTON, 1 ♀ (NMSE); Edinburgh, 25.v.1934, A. H. LATHAM, 1 ♂ 1 ♀ (NMSE); Edinburgh, 1998, SWT Garden Survey, 1 ♂ 1 ♀ AH115-B (NMSE); Edinburgh, 1998, SWT Garden Survey, 2 ♂♂ AH107-B (NMSE); Edinburgh, Botanical Gardens, v.1904, J. WATERSTON [in GRIMSHAW collection], 2 ♂♂ (NMSE); Currie, 17.vi.1936, J. WATERSTON, 1 ♂ (NMSE); Morningside, 21.v.1893, P. H. GRIMSHAW, 1 ♂ (NMSE); Balerno, 30.v.1894, P. H. GRIMSHAW, 1 ♂ (NMSE); Balerno, 4.vi.1914, P. H. GRIMSHAW, 1 ♂ (NMSE); Bravelaw Burn, Balerno, 30.v.1904, J. WATERSTON [in GRIMSHAW collection], 5 ♂♂ 3 ♀♀ (NMSE). **Midlothian:** Polton, 26.v.1893, P. H. GRIMSHAW, 1 ♂ (NMSE); Miltonbridge, 1500 GMT, suction trap, 21.vi.1951, E. C. PELHAM-CLINTON, 1 ♀ (NMSE); Arniston forest, NT323593, 26.v.1995, 130 m, A. E. WHITTINGTON, 1 ♀ (NMSE); Toxsidehill Moss, NT2954, 1.vi.1997, K. P. BLAND, 1 ♂ (NMSE); Moorfoots, Dewar, NT3447, 31.v.1997, K. P. BLAND, 1 ♂ 4 ♀♀ (NMSE); Crichton Glen, NT3761, 23.v.1998, K. P. BLAND, 1 ♀ (NMSE); Glencorse, 6.vi.1894, P. H. GRIMSHAW, 1 ♂ 1 ♀ (NMSE). **East Lothian:** Pencaitland, NT433689, attracted to house lights, 10.v.1995, A. E. WHITTINGTON, 1 ♂ (NMSE); Aberlady, 1903, [P. H. GRIMSHAW], 2 ♂♂ (NMSE); Dunglass, The Factors House, NT763722, 25.v.1997, 70 m, A. E. WHITTINGTON, 1 ♂ 2 ♀♀ (NMSE); Traprain, 24.v.1913, W. EVANS, 1 ♂ (NMSE). **North Ayrshire:** Arran, no details, G. H. VERRALL (EDWARDS (1921)). **Dumfries and Galloway:** Torrs, Wigtownshire, 28.v.1982, A. B. DUNCAN, 1 ♀ (NMSE); Corsemalzie, Whauphill, v.1899, J. G. GORDON, 1 ♂ 8 ♀♀ (NMSE); Colvend, 30.v.1896, R. SERVICE, 2 ♂♂ (NMSE); Lochar Bridge, 23.v.1983, A. B. DUNCAN, 2 ♀♀ (NMSE); White Coomb, 29.v.1996, K. P. BLAND, 1 ♂ (NMSE); Tynron, 25.v.1945 and 27.v.1945, A. B. DUNCAN, 1 ♀ (NMSE); Tynron, 10.vii.1980, A. B. DUNCAN, 1 ♀ (NMSE). **Scottish Borders:** Cademuir Hill, NT2337, 24.v.1998, K. P. BLAND, 1 ♂ (NMSE); Threepwood Moss, Roxburghshire, NT5142, 4.vi.1998, K. P. BLAND, 1 ♀ (NMSE); Rutherford, NT1654, 7.vi.1998, K. P. BLAND, 1 ♀ (NMSE); Megget Reservoir, 350 m, NT211233, 8.vi.1996, A. E. WHITTINGTON, 1 ♂ 1 ♀ (NMSE); Bonnington, NT2538, 24.v.1998, K. P. BLAND, 1 ♂ 2 ♀♀ (NMSE); Heriot, 28.vi.1898, W. EVANS [in GRIMSHAW collection], 1 ♀ (NMSE).

Bibio pomonae (FABRICIUS, 1775) – Records: SCOTLAND: **Orkney:** South Burn, Hoy, 12.viii.1938, J. SINCLAIR, 5 ♂♂ 1 ♀ (NMSE). **Outer Hebrides:** Isle of Barra, 17–28.viii.1936, A. R. WATERSTON, 1 ♂ 2 ♀♀ (NMSE); Barra, Loch an Duin, North Bay, 28.viii.1976, A. R. WATERSTON, 1 ♂ (NMSE); Tarbert, Harris, ix.1882, C. W. DALE (GRIMSHAW 1914). **Highland:** Skye, NG4644 (Vc 104), Portree, Sulishaderbeg Wood, 11.ix.1996, K. P. BLAND, 1 ♂ (NMSE); Skye, Floddigarry, NG4771, tarn by road, 28.viii.1989, P. SKIDMORE (SKIDMORE 2009); Skye, Waternish House alderwood, NG2658, 31.viii.1989, P. SKIDMORE (SKIDMORE 2009); Rùm (SKIDMORE 2009); Muck, no details (SKIDMORE 2009); Sutherland, Loch Assynt, 58°15'N 05°00'W, 20.vii.1911, Lt. Col. YERBURY, 1 ♂ (NHML); Sutherland, Kylesku, 58°20'N 05°00'W, 5.vii.1911, Lt. Col. YERBURY, 1 ♀ (NHML);

Sutherland, Inchnadamph, 14.viii.1964, E. C. PELHAM-CLINTON, 1 ♂ (NMSE); Traligrill Caves, Gleann Dubh, Inchnadamph, NC2720, 17.viii.2002, K. P. BLAND, 1 ♂ (NMSE); 6 miles S of Bonar Bridge, Vc106, 12.ix.1956, A. C. STEPHEN, 5 ♂♂ (NMSE); Cromarty, S of Sutor, 12.ix.1894, W. R. O. GRANT, 2 ♂♂ (NHML); Fortrose, 57°30'N 04°10'W, 14.vii.1919, W. R. O. GRANT, 1 ♀ (NHML); Fortrose, 57°30'N 04°10'W, 31.viii.1919, W. R. O. GRANT, 1 ♂ (NHML); Fortrose, 57°30'N 04°10'W, 9.ix.1919, W. R. O. GRANT, 1 ♂ (NHML); Kinlochewe, Ross[shire], 22.viii.1955, E. C. PELHAM-CLINTON, M. V. light, 1 ♂ (NMSE); W. Ross, Kinlochewe, Beinn Eighe, 57°35'N 05°20'W, 6.vii.1953, O. W. RICHARDS, 1 ♂ (NHML); Beinn Eighe, 1953, O. W. RICHARDS [in NCC collection], 1 ♂ 1 ♀ (NMSE); Beinn Eighe NNR, NH0064, native pinewood, malaise trap, viii.1989, I. MACGOWAN, 2 ♂♂ 1 ♀ (NMSE); Glen Spean, 26.viii.1972, [collector unknown], 2 ♂♂ 1 ♀ (TAUI); Corrour, West Inverness[shire], vii.1914, 1914.151.355 and 661, [collector unknown], 2 ♂♂ (NMSE); Corrour, Inverness[shire], vii.1915, P. H. GRIMSHAW, 1 ♂ (NMSE); Granish, 5.viii.1975, J. E. MARSHALL, 1 ♂ 1 ♀ (NHML); Nethy Bridge, viii.1893, [P. H. GRIMSHAW], 1 ♂ (NMSE); Nethy Bridge (NJ0120), 7.viii.1898, Lt. Col. YERBURY, 1 ♀ (NHML) [mentioned by GRIMSHAW (1900)]; Nethy Bridge (NJ0120), 28.vii.1911, Lt. Col. YERBURY, 2 ♂♂ 1 ♀ (NHML); Nethy Bridge (NJ0120), vii.1925, P. HARWOOD, 1 ♂ 1 ♀ (NHML); Abernethy, NJ0018, 15.viii.1952, [E. C. PELHAM-CLINTON], 2 ♂♂ 1 ♀ (NHML); Abernethy Forest (NESBReC); Aviemore, NH9013, 17.viii.1952, [E. C. PELHAM-CLINTON], 1 ♀ (NHML); Craigellachie, NH8912, 5.ix.1970, E. A. FONSECA, 1 ♂ 1 ♀ (NHML); Black Isle, Jane-field, 15.v.1894, R. SERVICE, 1 ♂ (NMSE); Highland [no locality given], 1600 feet, from crops of red grouse, 1–10.xii.1922, J. W. FROHAWK, 3 ♂♂ (NHML); Rothiemurchus, ix.–x.1894, HINXMAN (GRIMSHAW 1900). **Moray:** Forbes, 57°35'N 03°35'W, ix.1906, L. G. ESSEN, 1 ♀ (NHML); Dava, no date, REUTER, 1 ex. (UZMH); Kingston W of Buchie (NESBReC). **Aberdeen-shire:** Inchmarlo, 6.ix.2001, K. P. BLAND, 1 ♀ (NMSE); Morrone Birchwood, NO1490, 28.viii.2002, K. P. BLAND, 2 ♂♂ (NMSE); Culbean Hill, 1500 feet, 25.vii.1972, C. LYAL, 1 ♂ (NHML); Ellon (NESBReC); Backhill near Oldmeldrum (NESBReC); Loch Kinord near Ballater (NESBReC); Castle Fraser (NESBReC). **Perth and Kinross:** Rannoch Moor, Lochan Ghiubhais, NN4154, 7.ix.1996, K. P. BLAND, 1 ♂ 1 ♀ in copula (NMSE); Learan, Rannoch, NN5858, 20.viii.1998, K. P. BLAND, 2 ♂♂ (NMSE); Rannoch (NN6258), vii.1906, L. G. ESSEN, 1 ♀ (NHML); Camghouran, Rannoch, NN5455, 20.viii.1998, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); NE of Cross Craigs, NN5552, 4.ix.2002, K. P. BLAND, 2 ♂♂ (NMSE); Stuchd an Lochain summit, NN4844, 960 m, 6.viii.2003, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Glen Callater, mass swarming over heather, NO185845, 22.viii.2002, J. SKARTVEIT, 3 ♂♂ (NMSE); The Cairnwell, NO1377, 11.vii.1999, 16.vii.2001 and 9.vii.2003, K. P. BLAND, 4 ♂♂ (NMSE); Glenshee, NO1070, 29.vi.1894, G. J. HAMPSON, 1 ♂ (NHML); Schiehallion, Lochan an Daim, NN7157, 7.ix.1996, K. P. BLAND, 1 ♀ (NMSE); Blair Atholl, ix.1898, W. EVANS, 2 ♂♂ (NMSE); Tummel Bridge, 4.vi.1934, A. H. LATHAM, 1 ♂ (NMSE); Meall Odhar, Perthshire, 850 m, 8.viii.2002, K. P. BLAND, 1 ♂ (NMSE); Dalnaspidal, NN6472, 14.ix.1996, K. P. BLAND, 3 ♂♂ (NMSE); Summit Meall nan Tarmachan, 22.viii.2002, K. P. BLAND, 2 ♂♂ (NMSE); Meall nan Tarmachan, > 1000 m, 13.ix.2002, K. P. BLAND, 1 ♂ (NMSE); Abercairnie, NN9122, heathery, pitfall traps, 29.viii.1995, D. MCCracken et al., numerous ♂♂ (NMSE); Ghuibhsachain, *Betula nana* environs, NN9974, 9.viii.2001, K. P. BLAND, 1 ♂ (NMSE); Gleann Mór Bridge, NO0077, 22.ix.1998, K. P. BLAND, 2 ♂♂ (NMSE); Gleann Mór, NO0076, 28.ix.2002, K. P. BLAND, 1 ♂ (NMSE); Carn an t-Sionnaich, NO0075, 10.ix.2000, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Fealar Gorge (Upper), NN0079, 27.ix.1999, K. P. BLAND, 1 ♀ (NMSE); Fealar Gorge, NN0079, 22.ix.1997, K. P. BLAND, 1 ♀ (NMSE); Methven Moss, viii.1894, MCGREGOR (GRIMSHAW 1895); Kinfauns Woods, 1896, WYLIE (GRIMSHAW 1899); Falls of Bruar, 10.ix.1898, W. EVANS (GRIMSHAW 1899); Fenderbridge near Blair Atholl, ix.1898, W. EVANS (GRIMSHAW 1899). **Angus:** Loch Brandy, Glen Clova, NO3375, 23.viii.1996, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); The Scorie, Glen Clova, NO2575, 21.viii.1996, K. P. BLAND, 7 ♂♂ (NMSE); Craig Mellon, Glen Doll, NO2676, 19.viii.1996, K. P. BLAND, 1 ♂ (NMSE); Caenloch, 6.viii.2005, K. P. BLAND, 1 ♂ (NMSE). **Argyll and Bute:** Garbh Eileach, NM667119, wet meadow (M23), *Juncus acutiflorus*, 2.vii.1998, P. W. WORMELL, 1 ♀ (NMSE); Morven, 27.viii.1930, A. H. LATHAM, 1 ♀ (NMSE); Morven, 27.ix.1930, A. H. LATHAM, 1 ♂ (NMSE); Helensburgh, 12.viii.1904, J. MALLOCH, 1 ♂ (NMSE); Lephinmore, 1.ix.1951, 6.ix.1951 and 20.ix.1951, at light, [collector unknown, presumed E. C. PELHAM-CLINTON], 4 ♂♂ 2 ♀♀ (NMSE); Beinn Dorain, 3000–3500 feet, 2.ix.1962, E. C. PELHAM-CLINTON, 1 ♀ (NMSE). **Stirling:** Glen Finglas, plot D1, NN485123, 10.vi.2003, J. SKARTVEIT, 7 larvae (NMSE). **Fife:** Kinshaldy, 4.vii.1949, [D. J. JACKSON], 1 ♂ (NMSE); Paradise, St Andrews, 16.viii.1947, D. J. JACKSON, 4 ♂♂ (NMSE); Kinghorn, 4.ix.2001, B. LITTLE, 1 ♂ (NMSE). **North Ayrshire:** Arran, Catacol, NR9150, ix.1920, J. WATERSTON, 2 ♂♂ 1 ♀ (NHML); Arran, Catacol, NR9150, viii.1922, A. R. WATERSTON, 1 ex. (NHML); Arran, Covie, 10.ix.1954, A. R. WATERSTON, 1 ♂ (NMSE); Arran, Merkland Wood, NS020390, 13.vii.2002, J. SKARTVEIT, 1 ♀ (NMSE); Arran, Sliderry, NR9323, viii–ix.1926, A. R. WATERSTON, 2 ♀♀ (NHML). **West Dunbartonshire:** Bonhill, 18–26. viii.1904, J. MALLOCH, 4 ♂♂ 1 ♀ (NMSE). **East Dunbartonshire:** Balmore, viii.1929, T. E. D. POORE, 1 ♂ (NMSE). **Renfrewshire:** ‘Old Manse’ Kilbarchan, 17.viii.1947, F. J. RAMSAY, at light, 1 ♂ (NMSE); ‘Old Manse’ Kilbarchan, 11.ix.1947 and 20.ix.1947, F. J. RAMSAY, swept in rough herbage, 2 ♀♀ (NMSE); ‘Old Manse’ Kilbarchan, Renfrewshire, 24.vi.1945, F. J. RAMSAY, on wall, 1 ♀ (NMSE). **West Lothian:** Polkemmet Moor, NS911628, 21.viii.1998, B. SAVILLE, goat willow, 1 ♂ AH214 (NMSE); Addiewell Bing (N), 15.v.2005, K. P. BLAND, 1 ♀ (NMSE); Fauldhouse Moor, NS917619, Vc84, 21.viii.1998, B. SAVILLE, hawthorn, 1 ♀ AH215 (NMSE). **City of Edinburgh:** Fairmilehead, 10.ix.1931, A. H. LATHAM, 1 ♂ (NMSE); Edinburgh, 8.viii.1934, A. H. LATHAM, 1 ♂ (NMSE); Edinburgh, 18.viii.1934 and 25.viii.1934, A. H. LATHAM, 2 ♂♂ (NMSE); Edinburgh,

10.ix.1934, A. H. LATHAM, 1 ♂ (NMSE); Edinburgh, 28.viii.1937, A. H. LATHAM, 1 ♂ (NMSE); Edinburgh, 19.viii.1947, A. H. LATHAM, 1 ♀ (NMSE); Edinburgh, Chambers Street, 30.viii.2001, K. P. BLAND, 1 ♀ (NMSE); Mansfield Place, NT257747, 28.viii.1999, D. SIVELL, 1 ♀ (DSPC); Listonshiels, 4.ix.1918, W. EVANS, 1 ♀ (NMSE). **Midlothian:** Dundreich Plateau, NT295495–NT293495, 18.vii.1998, D. SIVELL, river gully, 1 ♂ 1 ♀ AH196 (NMSE); Dundreich Plateau, NT295488, Vc83, 18.vii.1998, D. SIVELL, soft rush, bracken, 1 ♂ AH198 (NMSE); Dundreich Plateau, NT295495, Vc83, 18.vii.1998, B. SAVILLE, cleugh vegetation, 1 ♂ AH192 (NMSE); Dundreich, NT2949, 18.vii.1998, K. P. BLAND, 2 ♂♂ (NMSE); Bavelaw, NT165624, 28.viii.1998, D. SIVELL, wet flush in field, 1 ♂ AH226 (NMSE); North Esk Cottage, NT1557, 26.vii.2003, K. P. BLAND, 1 ♂ (NMSE); Gladhouse, 18.viii.1999, K. P. BLAND, 3 ♂♂ 1 ♀ (NMSE); Glencorse, 8.ix.1898, P. H. GRIMSHAW (GRIMSHAW 1903). **East Lothian:** Boltonmoor [probably Bolton Muir Wood], 12.vii.1913, W. EVANS, 1 ♂ (NMSE); Papan Water, NT588679, 18.vii.1999, B. SAVILLE, deciduous trees, 2 ♂♂ AH281 (NMSE); Lammermuir Hills, 350 m, near Horseupcleugh, NT6657, 12.viii.1995, A. E. WHITTINGTON, 1 ♂ 1 ♀ and 1 ♂ 1 ♀ in copula (NMSE); Lammermuir Hills, 350 m, near Horseupcleugh, NT6657, 12.viii.1995, I. E. WHITTINGTON, 1 ♀ (NMSE); Lammermuir Hills, 350 m, near Horseupcleugh, NT6657, 12.viii.1995, K. E. WHITTINGTON, 2 ♂♂ (NMSE); Dunglass, NT7672, 9.viii.1997, A. E. WHITTINGTON, 4 ♂♂ 1 ♀ (NMSE). **Dumfries and Galloway:** Carrifran Glen, malaise trap, 24.viii–23.ix.2000, K. P. BLAND, 1 ♂ (NMSE); Tynron, 2.viii.1943, A. B. DUNCAN, 5 ♂♂ 1 ♀ (NMSE); Tynron, 3.viii.1943, A. B. DUNCAN, 1 ♀ (NMSE); Caerlaverock, 8.viii.1980, A. B. DUNCAN, 2 ♂♂ 3 ♀♀ (NMSE). **Scottish Borders:** Adderstonlee Moss, Roxburghshire, NT5311, 10.viii.2002, K. P. BLAND, 1 ♂ (NMSE); Stobo, 27.viii.1963, A. G. [unknown collector], 14 ♂♂ (NMSE); Moorfoot hills, Peeblesshire, 1.vi.1940, R. A. COOPER [in KEVAN collection], 1 ♀ (NMSE).

Bibio varipes MEIGEN, 1830 – **Records:** SCOTLAND: **Highland:** Druim an Dubh-leathaid Wood, Arisaig, NM6585, 1.iv.1994, D. HORSFIELD, 1 ♂ (NMSE); Strathpeffer, NH478574, 7.v.2012, 16.v.2012, 31.v.2013 and 2.vi.2013, M. MACDONALD, 6 ♂♂ (NMSE); Blackmuir Wood, Stathpeffer, NH4757, 6.v.2012 and 21.v.2013, M. MACDONALD, 2 ♂♂ 1 ♀ (NMSE); Brahan, Stathpeffer, NH5153, 21.v.2013 M. MACDONALD, 1 ♀ (NMSE); Dundonnell House, Wester Ross, NH1185, 2.vi.2013, M. MACDONALD, 1 ♀ (NMSE); Grantown-on-Spey (NESBReC); Boat of Garten, NH9419, v.1934, F. W. EDWARDS (♂ = paratype of *B. edwardsi*), 1 ♂ 1 ♀ (NHML); Kincaig, 31.v.1908, P. H. GRIMSHAW, 1 ♂ (NMSE); Aviemore, NH9013, 18.v.1959, W. DAVIDSON, 1 ♂ (NHML); Spey Bridge, NJ0120, 3.vi.1962, E. A. FONSECA, 1 ♀ (NHML). **Perth and Kinross:** Fealar Gorge, 1500 feet, 22.ix.1997, K. P. BLAND, M. V. light, 1 ♀ (NMSE); Clunie Dam, NN8860, 8.iv.2004, K. P. BLAND, as pupae in debris at base of Birch, em. indoors, 20.iv.2004, 1 ♂ 1 ♀ (NMSE); Balrobbie Farm, NN9062, 8.iv.2004, K. P. BLAND, as pupa in soil at base of Birch, em. indoors, 19.iv.2004, 1 ♂ (NMSE); S of Finegand, NO1465, 13.v.1998, K. P. BLAND, 2 ♂♂ 1 ♀ (NMSE). **Angus:** Monifieth, spring 1916, prey of empidids (CARTER 1916). **Stirling:** Brig o’ Turk, NN535065, 22.v.2002, J. SKARTVEIT, 1 ♀ (NMSE). **Fife:** Lundin Links, 30.v.1930, A. H. LATHAM, 1 ex. (NMSE). **North Ayrshire:** Arran, Lower Glen Rosa at campsite, NS001376, 14.v.2004, J. SKARTVEIT, 1 ♂ (NMSE); Arran, between Brodick-Lamlash, NS020330, 16.v.2004, J. SKARTVEIT, 2 ♂♂ (NMSE). **Dunbartonshire:** Loch Lomond, 25.v.1967, E. A. FONSECA, 1 ♀ (NHML). **West Dunbartonshire:** Bonhill, 19.iii.1909 and 3.vi.1909, J. MALLOCH, 2 ♂♂ (NMSE). **West Lothian:** Linlithgow Golf Course, NS9875, 16.v.1999, K. P. BLAND, 2 ♂♂ (NMSE); Ashgrove, NT081741, 15.v.1996, vegetation, B. SAVILLE, 1 ♂ AH110 (NMSE). **City of Edinburgh:** Edinburgh, 1998, SWT Garden Survey, 1 ♂ AH97-B, 1 ♂ 1 ♀ AH104-B, 1 ♂ AH105-B, 1 ♂ AH111-B (NMSE); Malleny Mills, NT166654, woodland, 05.vi.99, D. SIVELL, 1 ♀ (DSPC). **Midlothian:** Arniston forest, NT323593, 26.v.1995, 130 m, A. E. WHITTINGTON, 1 ♀ (NMSE); Blackburn, Penicuik, NT2358, 21.v.2005, K. P. BLAND, 1 ♂ (NMSE); Stow, 9.vi.1963, A. R. WATERSTON [det. R. P. LANE as *B. edwardsi*], 1 ♂ (NMSE). **East Lothian:** Dunglass, The Factors House, NT763722, 25.v.1997, 70 m, A. E. WHITTINGTON, 5 ♂♂ 5 ♀♀ (NMSE). **East Ayrshire:** Stair, NS440235, 4.v.2003, 11.v.2003 and 18.v.2003, J. SKARTVEIT, 10 ♂♂ 3 ♀♀ (NMSE). **South Ayrshire:** Bridgend Mains, NS400213, 2.v.2004, J. SKARTVEIT, 1 ♂ (NMSE); Auchincruive, NS385235, 8.v.2002, 11.v.2002 and 12.v.2002, J. SKARTVEIT, 16 ♂♂ 8 ♀♀ (NMSE). **Dumfries and Galloway:** Corsemalzie, Whauphill, v.1899, J. G. GORDON, 1 ♀ (NMSE). **Scottish Borders:** Selkirkshire, Williamhope, NT4133, 10.v.1997, K. P. BLAND, 6 ♂♂ (NMSE).

Bibio venosus (MEIGEN, 1804) – **Records:** SCOTLAND: **Perth and Kinross:** Almond Valley, v.1894, MCGREGOR (GRIMSHAW 1895) [not seen].

Dilophus bispinosus LUNDSTRÖM, 1913 – **Records:** SCOTLAND: **Fife:** Falkland Palace, NO2507, 23.viii.2012, G. E. ROTHERAY, 1 ♀ (NMSE). **Midlothian:** Newbattle Woods near Dalkeith, Vc83, 22.viii.2000, B. SAVILLE, 1 ♀ (? NMSE).

Dilophus febrilis (LINNAEUS, 1758) – **Records:** SCOTLAND: **Orkney:** Stromness, Orkney, 12.v.2004, D. S. SINCLAIR, 1 ♂ 3 ♀♀ (NMSE). **Outer Hebrides:** Lewis, Greeta River Banks, 4.vi.1962, BROOMFIELD & VARDY, 2 ♀♀ (NHML); Loch na Gainmhelch, 3.vi.1962, BROOMFIELD & VARDY, 1 ♀ (NHML); North Uist, Baleshare, no details (SKIDMORE 2009); South Uist, no details (SKIDMORE 2009); Saint Kilda, no details (SKIDMORE 2009). **Highland:** Sutherland, Brora, 58°00’N 03°50’W, 23.vii.1899, Lt. Col. YERBURY, 1 ♀ (NHML); Beinn Eighe NNR, NH0064, native pinewood, malaise trap, vi.1989, I. MACGOWAN, 2 ♀♀

(NMSE); Skye, Loch na Dal woods, NG7015, 29.viii.1989, P. SKIDMORE (SKIDMORE 2009); Skye, Kilmarie, NG5518, 27.viii.1989, P. SKIDMORE (SKIDMORE 2009); Skye, Broadford Forest, NG6326, 27.v.1990, P. SKIDMORE (SKIDMORE 2009); Skye, Bereraig Bay, NG5153, 28.viii.1989, P. SKIDMORE (SKIDMORE 2009); Skye, Dunvegan Castle grounds, NG2549, *Sphagnum* bog, 23.vii.1989, P. SKIDMORE (SKIDMORE 2009); Skye, Mointeach nan Tarbh, Waternish, NG1548, 27.v.1992, P. SKIDMORE (SKIDMORE 2009); Skye, Lub Score near Cairidh Glumaig, NG4174, 25.v.1992, P. SKIDMORE (SKIDMORE 2009); Rùm, Kilmory, NG3603, 27.viii.2000, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Rùm, Kilmory, NG3603, 27–31.viii.2000, K. P. BLAND, 10 ♂♂ 3 ♀♀ (NMSE); Eigg, Cleadale, NM477880, 28.v.1970, A. M. HUTSON, 3 ♀♀ (NHML); Muck, no details (SKIDMORE 2009); Aviemore (NESBReC); Abernethy Forest (NESBReC); Advie (Speyside) (NESBReC); W of Loch Avon (NESBReC); SE of Cairn Gorm (NESBReC); Braeriach (NESBReC). **Perth and Kinross:** Learnan, Rannoch, NN5858, 20.viii.1998, K. P. BLAND, 1 ♂ (NMSE); Drunchastle, NN6858, 14.v.2004, K. P. BLAND, 1 ♂ (NMSE); Braes of Foss, NN7456, 15.v.2004, K. P. BLAND, 2 ♂♂ 1 ♀ (NMSE); Buchanty Spout, NN9328, 15.v.2004, K. P. BLAND, 3 ♂♂ 8 ♀♀ (NMSE); Blair Atholl, ix.1898, W. EVANS, 1 ♀ (NMSE); Ben Lawers, OS 51 607396, plot 6C, *Salix arbuscula*, 1.vi.2002, R. SHAW, 1 ♀ (MLURI); Gleann Beag Bridge, 27.ix.2002, K. P. BLAND, 1 ♂ (NMSE); Carn-an-t'sionnaich, NO0075, 10.ix.2000, K. P. BLAND, 1 ♂ (NMSE); Allt Féith Làir, NO0180, 23.xi.1998, K. P. BLAND, 1 ♂ (NMSE); Allt Féith Làir, NO0180, 15.v.1999, K. P. BLAND, 1 ♂ (NMSE); Allt Féith Làir, NO0381, 8.vi.2001, snowbed at 750 m, K. P. BLAND, 2 ♂♂ 1 ♀ (NMSE); Lochan Uaine, Beinn Iuthan Mòr, Fealar, NO0479, 15.v.2003, K. P. BLAND, 1 ♂ 3 ♀♀ (NMSE); Kinfauns Woods, 1896, WYLIE (GRIMSHAW 1899); Fender Bridge near Blair Atholl, ix.1898, W. EVANS (GRIMSHAW 1899). **Angus:** Loch of Kinnordy, NO3654, 28.iv.2000, K. P. BLAND, 1 ♂ (NMSE); Caenloch, 16.vi.2000, snowbeds, K. P. BLAND, 7 ♂♂ 3 ♀♀ (NMSE); Glas Maol, NO1676, snowfield, 1030 m, 23.v.2000, K. P. BLAND, 5 ♂♂ 7 ♀♀ (NMSE); Glas Maol summit, NO1576, 950–1000 m, on snow beds, 30.v.2001, K. P. BLAND, 1 ♂ 7 ♀♀ (NMSE); Glas Maol, NO167763, snow-beds, 1000–1050 m, 30.v.2001, K. P. BLAND, 11 ♂♂ 18 ♀♀ (NMSE); Glas Maol, NO1676, snowfield, 1030 m, 6.v.2002, K. P. BLAND, 3 ♂♂ (NMSE); Glas Maol, NO1676, 12.v.2004, under stones, K. P. BLAND, 2 ♀♀ (NMSE); Glas Maol summit, NO1676, 14.v.2005, snowbeds, 1020 m, K. P. BLAND, 13 ♂♂ 11 ♀♀ (NMSE); Cairn of Claise, NO1818, 18.v.2004, snowbeds, 1040 m, K. P. BLAND, 6 ♂♂ 3 ♀♀ (NMSE); Monifieth, spring 1916, prey of empids (CARTER 1916). **Argyll and Bute:** Isle of Jura, ix.1907, J. WATERSTON, 2 ♂♂ 1 ♀ (GRIMSHAW 1914); Colonsay, ? Balnahard area, no details (SKIDMORE 2009); Lephinmore, 20.iv.1951, bred from cow dung, 6 ♂♂ 1 ♀ (NHML); St. Catherine's, 4.xii.1952, from dung, 1 ♂ 1 ♀ (NMSE); St. Catherine's, 9.xii.1952, [presumed E. C. PELHAM-CLINTON], from dung, 12 ♂♂ 15 ♀♀ (NMSE); St. Catherine's, iv.1953, R. O. DARWISH [in E. C. PELHAM-CLINTON collection], bred from cow dung, 2 ♂♂ 1 ♀ (NMSE); Lismore, Kilcheran Marsh, NM8339, 1.vi.1978, P. SKIDMORE (SKIDMORE 2009); Lismore, Loch Baile a Ghoibhean, NM8642, 30.vi.1976, P. SKIDMORE (SKIDMORE 2009). **Stirling:** Gleann nam Meann, point 1118, NN527104, 22.viii.2003, S. BURGESS, 5 ex. (NMSE); Gleann nam Meann, point 7106, NN516140, 26.viii.2003, J. SKARTVEIT, 1 ex. (NMSE); Glen Finglas, point 3117, NN483120, 26.viii.2003, S. BURGESS, 1 ex. (NMSE); Glen Finglas, point 4103, NN485122, 25.viii.2003, J. SKARTVEIT, 1 ex. (NMSE); Glen Finglas, point 4113, NN485121, 25.viii.2003, S. BURGESS, 1 ex. (NMSE). **Fife:** Tayport, 4.x.1962, E. C. PELHAM-CLINTON, *Elymus*, 1 ♂ (NMSE); St Andrews, reared from pupa, gregarious in dead grass, 2.iv.1946, [presumed D. J. JACKSON], 2 ♂♂ (NMSE); St. Andrews, 4.v.1946, D. J. JACKSON, 1 ♀ (NMSE); St. Andrews, 5.viii.1947, D. J. JACKSON, 1 ♀ (NMSE); Massney Braes, Lower Largo, NO4202, 10.v.2000, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Lundin Links, 3.vi.1929, A. H. LATHAM, 1 ♀ (NMSE); Lundin Links, 14.v.1930 and 26.v.1930, A. H. LATHAM, 1 ♂ 1 ♀ (NMSE); Dumbarrie Links Wildlife Reserve, NO4402, 7.v.2000, G. B. CORBET, 1 ♀ on tideline (NHML); Dumbarrie Links, NN4402, 10.v.2000, K. P. BLAND, 1 ♂ (NMSE); Dumbarrie Links Wildlife Reserve, NO4402, 2.viii.2002, G. B. CORBET, 1 ♂ on sand at rabbit burrow; Dumbarrie Links Wildlife Reserve, NO4402, 6.ix.2002, G. B. CORBET, 1 ♂ on hogweed in ditch (NHML); Dumbarrie Links Wildlife Reserve, NO4402, 2.v.2003 and 13.v.2003, G. B. CORBET, 1 ♂ among marram and 1 ♂ swept from foredune; Dumbarrie Links Wildlife Reserve, NO4402, 13.viii.2003, G. B. CORBET, 1 ♂ on a *Valerian* flowerhead; Dumbarrie Links Wildlife Reserve, NO4402, 6.ix.2003 and 16.ix.2003, G. B. CORBET, 1 ♀ swept from *Atriplex* and 1 ♂ 1 ♀ from grass; Dumbarrie Links Wildlife Reserve, NO4302, 5.xii.2003, G. B. CORBET, ca. 10 larvae in topsoil at soak-away of ditch (*Cirsium arvense* etc.) from which one adult ♂ emerged on 10.v.2004; Dumbarrie Links Wildlife Reserve, NO4402, 3.v.2004, 10.v.2004 and 23.v.2004, G. B. CORBET, 1 ♀ swept from tall herbs, 1 ♂ from bracken, 1 ♀ on hawthorn and 1 ♀ in ditch; Dumbarrie Links Wildlife Reserve, NO4402, 24.viii.2004, G. B. CORBET, 2 ♂♂ on tansy flowers. **West Dunbartonshire:** Bonhill, 3.ix.1904, 10.ix.1904, 20.v.1905, 31.v.1905, 2.ix.1905 and 5.v.1907, J. MALLOCH, 4 ♂♂ 4 ♀♀ (NMSE). **Renfrewshire:** 'Old Manse' Kilbarchan, 24.viii.1944 and 14.v.1946, F. J. RAMSAY, on wall, 1 ♂ 1 ♀ (NMSE); 'Old Manse' Kilbarchan, 30.viii.1944, F. J. RAMSAY, on leaf of ash, 1 ♀ (NMSE); 'Old Manse' Kilbarchan, 14.viii.1945, F. J. RAMSAY, on house window, 1 ♀ (NMSE); 'Old Manse' Kilbarchan, 31.viii.1946 and 20.ix.1947, F. J. RAMSAY, swept from rough herbage, 1 ♂ 2 ♀♀ (NMSE); 'Old Manse' Kilbarchan, 19.viii.1947, F. J. RAMSAY, in flight, 1 ♀ (NMSE). **West Lothian:** Linlithgow Golf Course, NS989760, Vc84, 16.v.1999, B. SAVILLE, Rowan, 2 ♂♂ 2 ♀♀ AH259 (NMSE); Linlithgow Golf Course, NS9875, 16.v.1999, K. P. BLAND, 4 ♂♂ 3 ♀♀ (NMSE); Linlithgow Golf Course, NS9875, broad-leaved woodland, 16.v.1999, D. SIVELL, 1 ♀ (DSPC); Linlithgow Golf Course, NS989760, Vc84, 16.v.1999, B. SAVILLE, Rowan, 2 ♂♂ 2 ♀♀ AH259 (NMSE); Easter Inch Moss, NT003665, Vc84, 16.v.1998, R. MARR, 2 ♀♀ AH173 (NMSE); Fauldhouse Ponds,

NS919605, Vc84, 2.ix.1998, H. YOUNG & P. HAY, 2 ♀♀ AH238 (NMSE); Lochart Mill Glen, NS8744, 5.x.1996, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Millwood Glen, NS8447, 5.x.1996, K. P. BLAND, 1 ♂ 2 ♀♀ (NMSE). **City of Edinburgh:** Dalmeny Park, NT1677, 24.viii.2003, K. P. BLAND, 2 ♂♂ 4 ♀♀ (NMSE); North Merchiston Cemetery, NT233722, 19.viii.1998, D. SIVELL, 3 ♀♀ AH212 (NMSE); Morningside, Edinburgh, 14.x.1915, in house, W. EVANS, 1 ♀ (NMSE); Edinburgh, 30.viii.1934, 20.ix.1934 and 2.x.1934, in house, W. EVANS, 3 ♀♀ (NMSE); Edinburgh, 1998, SWT Garden Survey, 1 ♂ 3 ♀♀ AH31-B, 2 ♀♀ AH38-B, 1 ♀ AH89-B, 1 ♂ 1 ♀ AH104-B, 2 ♂♂ 1 ♀ AH108-B, 1 ♂ AH115-B, 1 ♂ 1 ♀ AH151-B, 3 ♂♂ 6 ♀♀ AH155-B, 1 ♀ AH150-B, 3 ♂♂ AH156-B, 3 ♂♂ 6 ♀♀ AH157-B and 3 ♀♀ AH158-B (NMSE); Portobello promenade, v.2004 and vi.2004, D. SIVELL, many ♀♀ swarming [field observation]; Edinburgh, Henderson Row, NT2474, 26.iv.2001, K. P. BLAND, 1 ♀ (NMSE); Figgate Park, NT300736, on Whitebeam, 12.v.1999, D. SIVELL, 2 ♂♂ (DSPC); Figgate Park, NT299737, resting under bramble leaf, 11.iv.1999, D. SIVELL, 1 ♂ (DSPC); Royal Scottish Museum, Edinburgh, 25.v.1960, swarming, [collector unknown, but in A. R. WATERSTON's hand], 4 ♂♂ 1 ♀ (NMSE); Royal Dick Vet School, Edinburgh, 28.i.1999, K. P. BLAND, 1 ♂ (NMSE); National Museums of Scotland, Edinburgh, Entomology Lab. (Gallery 2.9), 13.viii.2002, K. P. BLAND, 1 ♂ (NMSE); Edinburgh, Blackford, NT2571, 6.vi.1996, K. P. BLAND, 1 ♂ (NMSE); Edinburgh, Blackford, NT2571, 4–5.ix.1999, K. P. BLAND, 2 ♂♂ (NMSE); Edinburgh, Blackford, NT2570, 30.iv.2000, K. P. BLAND, 1 ♀ (NMSE); Edinburgh, Blackford, NT2570, 4.v.2004, K. P. BLAND, 1 ♀ (NMSE); Dalmeny Estate, NT158796, Vc84, 31.viii.1998, D. GARNER & H. YOUNG, Conifers, 1 ♂ AH224 (NMSE); Dalry Park, NT237726, Vc83, 6–8.viii.2000, B. SAVILLE, 1 ♂ 1 ♀ AH326 (NMSE); Dean Gardens, NT243741, Vc83, 15.viii.1998, B. SAVILLE, swept vegetation, 1 ♂ AH211 (NMSE); Edinburgh, Neighbourhood, STEWART (GRIMSHAW 1903); Morningside, 1.iv.1894, P. H. GRIMSHAW (GRIMSHAW 1903). **Midlothian:** Bush, 26.viii.1954, E. C. PELHAM-CLINTON, 1 ♂ (NMSE); Bush, 9.vi.1951, E. C. PELHAM-CLINTON, 1 ♀ (NMSE); Bavelaw, NT165624, Vc83, 28.viii.1998, D. SIVELL, wet flush in field, 4 ♂♂ 2 ♀♀ AH226 (NMSE); Red Moss, Bavelaw, NT1663, 7.v.2007, K. P. BLAND, 2 ♂♂ (NMSE); Glencorse Reservoir, NT217641, Vc83, 4.ix.1998, B. SAVILLE, pine, 1 ♂ AH230 (NMSE); Glencorse Visitor Centre, NT232631, Vc83, 4.ix.1998, B. SAVILLE, deciduous trees, 2 ♂♂ AH233 (NMSE); Old Pentland Cemetery, NT2666, 16.v.2004, K. P. BLAND, 2 ♂♂ (NMSE); Mavisbank Pond, NT289654, Vc83, 31.viii.1999, B. SAVILLE, rushes at west end, 2 ♂♂ 3 ♀♀ AH296 (NMSE); Mavisbank Pond, NT291655, Vc83, 27.viii.1999, B. SAVILLE, *Filipendula/Equisetum*, 2 ♂♂ AH300 (NMSE); Lasswade ("Dobbies"), NT3167, 22.v.2004, K. P. BLAND, 1 ♀ (NMSE); Dalkeith Oakwood, NT336686, Vc83, 22.viii.1998, B. SAVILLE, on oak, 2 ♂♂ AH295 (NMSE); Newhailes Estate, NT328729, field boundary, 16.v.2004, D. SIVELL, 1 ♀ [field observation]; Vogrie Country Park, NT3863, 15.ix.2002, K. P. BLAND, 1 ♀ (NMSE); Longniddry Bents, NT429761, coastal scrub, 18.iv.1999, D. SIVELL, 1 ♀ (DSPC); Roslin, 12.x.1950, E. C. PELHAM-CLINTON, at light, 1 ♀ (NMSE); Miltonbridge, 1500–1600 GMT, suction trap, 15.ix.1951, 17.ix.1951, 22.ix.1951 and 27.ix.1951, E. C. PELHAM-CLINTON, 5 ♂♂ (NMSE); Miltonbridge, traps no. 10, 25 and 30, 6.viii.1952, 13.viii.1952 and 21.viii.1952, R. O. DARWISH, 2 ♂♂ 1 ♀ (NMSE). **East Lothian:** Musselburgh, NT3472, 5.viii.1999, 100 m, A. E. WHITTINGTON, 2 ♂♂ 2 ♀♀ (NMSE); Pencaitland, attracted to house lights, NT433689, 10.v.1995, A. E. WHITTINGTON, 1 ♀ (NMSE); Stenton Village, NT6274, 26.viii.2001, 100 m, at *Mentha*, A. E. WHITTINGTON, 2 ♀♀ (NMSE); Stenton Village, NT6274, 3–6.v.2002, 11.v.2002, 15.v.2002, 20.v.2002 and 11.viii.2002, 100 m, A. E. WHITTINGTON, 5 ♂♂ 8 ♀♀ (NMSE); Dungleigh, The Factors House, NT763722, 16.ix.2000, 70 m, A. E. WHITTINGTON, 4 ♂♂ 1 ♀ (NMSE); Dunbar, NT6684, 16.v.2010, A. E. WHITTINGTON, 1 ♂, 1 ♀ (NMSE); Dunbar railway station, 10.viii.1999, A. E. WHITTINGTON, 1 ♂ 1 ♀ in copula (NMSE); Luffness, 2.ix.1941, D. K. KEVAN, 1 ♂ (NMSE); Aberlady, no details, 1 ♂ 2 ♀♀ (NMSE); Gullane, 12.ix.1951, E. C. PELHAM-CLINTON, swept from sedge, 1 ♂ (NMSE). **North Ayrshire:** Arran, Catacol, NR9150, viii.1922, A. R. WATERSTON, 1 ♂ (NHML); Arran, Summit Cir Mhor, NR972432, 799 m, 14.v.2004, J. SKARTVEIT, 1 ♀ (NMSE); Arran, Holy Island, Mullach Mor, NS063297, 314 m, 16.v.2004, J. SKARTVEIT, 2 ♂♂ (NMSE); Arran, Sliderry, NR9323, viii.–ix.1926, A. R. WATERSTON, 1 ♂ (NHML); Lochwinnoch, Renfrew Regional Park, Castle Semple Loch, NS3759, 4.ix.1970, A. CHRISTIE, 2 ♀♀, (NHML). **East Ayrshire:** Stair, NS438230, 18.iv.2004 and 4.v.2003, J. SKARTVEIT, 2 ♀♀ (NMSE). **South Ayrshire:** Auchincruive, NS385235, 6.iv.2002, 14.iv.2002, 27.iv.2002 and 1.v.2002, J. SKARTVEIT, 1 ♂ 3 ♀♀ (NMSE). **Dumfries and Galloway:** Torrs, Wigtownshire, 14.v.1983 and 18.v.1983, A. B. DUNCAN, 6 ♀♀ (NMSE); Glencaple, Dumfries, 6.ix.1979, A. B. DUNCAN, 5 ♂♂ (NMSE); Caerlaverock, 2.v.1980 and 26.viii.1981, A. B. DUNCAN, 2 ♂♂ (NMSE); Johnfield, 8.v.1982, A. B. DUNCAN, 1 ♂ (NMSE); Lochar Bridge, 7.v.1982, A. B. DUNCAN, 1 ♂ (NMSE); Corsemalzie, Whauphill, NX3452, v.1899, J. G. GORDON, 3 ♂♂ 3 ♀♀ (NMSE); Carrifran Glen, malaise trap, 24.viii.–23.ix.2000, K. P. BLAND, 14 ♂♂ 21 ♀♀ (NMSE); Carrifran Glen, 23.ix.–22.x.2000, K. P. BLAND, 1 ♂ (NMSE); Tynron, 17.ix.1946, A. B. DUNCAN, 2 ♂♂ 2 ♀♀ (NMSE); Castlehill, Dumfries, 22–24.ix.1979, A. B. DUNCAN, 4 ♂♂ 8 ♀♀ (NMSE). **Scottish Borders:** Green Cleugh, NT181622, wet flushes, 28.viii.1996, D. SIVELL, 1 ♀ (DSPC); Meggatt Reservoir, 350 m, NT211233, 8.vi.1996, A. E. WHITTINGTON, 1 ♂ 5 ♀♀ (NMSE); Lochurd Marsh, NT1041, 22.v.2004, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Lochurd Farm, Site LD323, NT114414, 3.vi.2003, J. SKARTVEIT, 1 ex. (NMSE); Hairneylaw South, near Sourhope, NT845205, 19.iii.2003, D. MCCracken, 64 larvae (NMSE); Nether Hill, Site NR220, NT369255, 21.v.2003, J. SKARTVEIT, 1 ex. (NMSE); Bonnington, NT2538, 24.v.1998, K. P. BLAND, 1 ♂ (NMSE); Selkirk, NT434275, 12.ix.1962, A. R. WATERSTON, 1 ♂ 2 ♀♀ (NMSE); Adderstonelee Moss, Roxburghshire, NT5312, 5.ix.1998, K. P. BLAND, 3 ♂♂ 3 ♀♀ in copula (NMSE); Adderstonelee Moss, Roxburghshire, NT5311, 10.viii.2002, K. P. BLAND, 1 ♀ (NMSE);

Heriot Road, Vc83, 23.viii.1924, A. R. WATERSTON, 1 ♂ (NMSE); Teviot Water Gardens, Roxburghshire, NT7027, 5.v.2002, 50 m, riparian, A. E. WHITTINGTON, 3 ♂♂ 2 ♀♀ (NMSE); Berwickshire, The Hirsell, near Coldstream, Dundock Wood, NT8240, 5.v.2002, 30 m, A. E. WHITTINGTON, 2 ♂♂ 1 ♀ (NMSE); Pease Bridge, 1843, J. HARDY (GRIMSHAW 1903).

***Dilophus femoratus* MEIGEN, 1804 – Records:** SCOTLAND: **Shetland:** Hellisterness, HU3849, 14–18.vi.2006, K. P. BLAND, 6 ♂♂ (NMSE); Sumburgh, 1.vi.2004, K. P. BLAND, 4 ♂♂ (NMSE); Shetland, vi.1890, C. W. DALE (GRIMSHAW 1905); South Harbour, Fair Isle, 31.v.2004, K. P. BLAND, 3 ♂♂ 1 ♀ (NMSE). **Outer Hebrides:** St Kilda, vi–vii.1905, J. WATERSTON, 1 ♂ [listed by GRIMSHAW (1907) as *Dilophus febrilis*] (NMSE); St Kilda, Hirta, Village Bay, 3–17.vi.1961, W. M. RUSSELL, from *Iris* beds, 4 ♂♂ 2 ♀♀ (NMSE); St Kilda, Hirta, Glen Bay, 3–17.vi.1961, W. M. RUSSELL, 1 ♂ (NMSE); St Kilda, Hirta, Mullach Bay, 10.vi.1961, W. M. RUSSELL, from *Iris* beds, 2 ♂♂ (NMSE); Soray, Flannan Isles, vi.1988, M. ELLIOT, 1 ♂ (NMSE); Eilean Tighe, Flannan Isles, vi.1988, M. ELLIOT, 1 ♀ (NMSE); Western Isles, R. Unst, 19–21.vi.1914, W. R. O. GRANT (NHML); Lewis, Melbost, on dunes with marram grass, 11.vi.1962, BROOMFIELD & VARDY, 8 ♂♂ 4 ♀♀ (NHML); North Uist, Balelone, vi.1905, J. WATERSTON (GRIMSHAW 1914); South Uist, 13.vi.1906, N. B. KINNEAR, 3 ♂♂ (NMSE); South Uist, 13.vi.1906, N. B. KINNEAR [in GRIMSHAW collection], 1 ♂ 1 ♀ (NMSE); South Uist, Skipport, vi.1906, J. WATERSTON (GRIMSHAW 1914); South Uist, S of Loch Boisdale, mid-holocene dig, excavated 26.iv.1999, M. DINNIN (SKIDMORE 2009); South Uist, Allt Volagir, mid-late vi.1995, T. ROPER (SKIDMORE 2009); South Uist, Bornish, mid-late vi.1995, T. ROPER (SKIDMORE 2009); South Uist, Pollachar, mid-late vi.1995, T. ROPER (SKIDMORE 2009); Isle of Barra, 11–23.vi.1937, A. R. WATERSTON, 2 ♀♀ (NMSE). **Highland:** Invernaver, Sutherland, 8.vi.1963, E. C. PELHAM-CLINTON, 1 ♂ (NMSE); Raasay, no details (SKIDMORE 2009); Skye, Uig, vi.1906, J. WATERSTON, 1 ♀ (GRIMSHAW 1914); Skye, Glen Uig, NG4064, 28.v.1990, P. SKIDMORE (SKIDMORE 2009); Skye, Dunvegan, vi.1905, J. WATERSTON (GRIMSHAW 1914); Skye, Broadford Forest, NG6326, 27.v.1990, P. SKIDMORE (SKIDMORE 2009); Rùm, Guirdil, pitfall trap, v.–viii.2000, D. BEAUMONT, 1 ♀ (NMSE); Eigg, Cleadale, NM477880, 28.v.1970, A. M. HUTSON, 1 ♂ (NHML); Muck, no details (SKIDMORE 2009); Mull, Salen Bay, NM5744, 28.v. 1991, P. SKIDMORE (SKIDMORE 2009); Mull, Laggan Bay, NM4541, 28.v.1991, P. SKIDMORE (SKIDMORE 2009); Mull, Knock alder wood, NM5439, 30.v.1991, P. SKIDMORE (SKIDMORE 2009); Tiree, Baugh dunes, NM0244, 25.vi.1999 (SKIDMORE 2008); Tiree, Baugh dunes, NM0146, 28.vi.1999 (SKIDMORE 2008); Tiree, Baugh Chapel bay, NM0244, 25.vi.1999 (SKIDMORE 2008); Tiree, Barrapol dunes, NL9442, 26.vi.1999 (SKIDMORE 2008); Tiree, Balephetrish, NM0147, 27.vi.1999 (SKIDMORE 2008); Cromarty, N of Sutor, 12.vi.1894, W. R. O. GRANT, 2 ♂♂ 1 ♀ (NHML); Glenmore, 9.vi.1967, E. A. FONSECA, 1 ♂ 2 ♀♀ (NHML); Nethy Bridge, NJ0120, 10.vi.1962, E. A. FONSECA, 1 ♀ (NHML); Aviemore, NH9013, 11–21.vi.1960, E. A. FONSECA, 1 ♀ (NHML); Loch Palchar, 12.vi.1971, E. A. FONSECA, 1 ♀ (NHML); Cairn Gorm, NJ0004, ca. 3700 feet, 29.vi.1966, HUTSON, 1 ♀ (NHML); Corrie an Lochain, 3900 feet, Cairngorm, 15–26.vi.1938, A. R. WATERSTON, 1 ♀ (NMSE); Kincaird district, [collector unknown], 1 ♀ (NMSE); Loch Assynt, 11.vi.1911, Lt. Col. YERBURY (YERBURY 1912); Kingussie (NESBReC); Aviemore (NESBReC); Abernethy Forest (NESBReC); Grantown-on-Spey (NESBReC); Advie (NESBReC). **Aberdeenshire:** Braemar, NO1592, 24.vi.–3.vii.1951, R. L. COE, 1 ♂ 1 ♀ (NHML); Braemar (NESBReC); Glen Lui at Linn of Dee (NESBReC); Loch Callater, NO1884, ca. 1500 feet, 26.vii.1951, [E. C. PELHAM-CLINTON], 1 ♀ (NHML). **Perth and Kinross:** Allt Fèith Làir, 9–23.vi.1999, K. P. BLAND, 4 ♂♂ 2 ♀♀ (NMSE); Fealar Gorge, NN0079, 24–25.vi.1997, K. P. BLAND, 2 ♂♂ 2 ♀♀ (NMSE); Fealar Gorge, 24.vi.1997, K. P. BLAND, 3 ♂♂ 2 ♀♀ (NMSE); Gleann Mór, yellow basin trap, 17–22.vi.1998, K. P. BLAND, 1 ♂ 3 ♀♀ (NMSE); Fusichan [= Ghuibhsachain], 24.vi.1999, K. P. BLAND, 1 ♀ (NMSE). **Fife:** Kincardineshire, Clatterin' Brig, 11.vi.1997, K. P. BLAND, 1 ♂ 1 ♀ (NMSE); Dumbarnie Links Wildlife Reserve, NO4402, 19.vi.2002 and 28.vi.2002, G. B. CORBET, 2 ♂♂ swept from tall grass near roses and 1 ♀ on *Sedum*; Dumbarnie Links Wildlife Reserve, NO4302, 5.vii.2002, G. B. CORBET, 1 ♂ 3 ♀♀ swept on *Geranium pratense* and 1 ♂ on *Heracleum*; Dumbarnie Links Wildlife Reserve, NO4402, 10.v.2004, G. B. CORBET, swept from long grass, 1 ♂. **West Dunbartonshire:** Bonhill, 2.vi.1905, 5.vi.1905, 17.vi.1905 and 31.v.1906, J. MALLOCH, 4 ♂♂ 3 ♀♀ (NMSE). **Renfrewshire:** 'Old Manse' Kilbrachan, Renfrewshire, 30.v.1944, F. J. RAMSAY, on wall, 1 ♀ (NMSE). **City of Edinburgh:** Arthur's Seat, NT278726, 100 m, 15.vi.1996, A. E. WHITTINGTON, 8 ♂♂ 1 ♀ (NMSE); Arthur's Seat, 15.vi.1996, K. P. BLAND, 2 ♂♂ 2 ♀♀ (NMSE); Edinburgh, 1998, SWT Garden Survey, 1 ♂ AH108-B, 7 ♂♂ 9 ♀♀ AH115-B, 1 ♂ AH199-B (NMSE); Hermitage of Braid, NT250702, woodland, 30.v.1999, D. SIVELL, 2 ♀♀ (DSPC, NMSE); Blackford, NT2571, 6.vi.1996, K. P. BLAND, 1 ♀ (NMSE); Currie, 17.vi.1936, A. R. WATERSTON, 1 ♀ (NMSE); Balerno, 1897, [P. H. GRIMSHAW], 1 ♂ (NMSE). **Midlothian:** Miltonbridge, 1600 and 1700 GMT, suction trap, 21.vi.1951 and 22.vi.1951, E. C. PELHAM-CLINTON, 1 ♂ 1 ♀ (NMSE). **East Lothian:** Luffness, Gala Law, NT4781, 10.vi.2001, K. P. BLAND, 1 ♂ (NMSE); Dunglass, The Factors House, NT763722, 70 m, 25.v.1997, A. E. WHITTINGTON, 1 ♂ (NMSE); Aberlady, 1896, [P. H. GRIMSHAW], 1 ♂ (NMSE); Aberlady, 1903, [P. H. GRIMSHAW], 6 ♂♂ 3 ♀♀ (NMSE); Aberlady, vii.1898, W. EVANS, 1 ♀ (NMSE); Luffness Links, 11.vii.1920, W. EVANS, 1 ♀ (NMSE); Ormiston, 3.v.1915, W. EVANS, 1 ♀ (NMSE); Pencaitland, Vinefields Housing Estate, NT433689, 80 m, 3.iii.1996, A. E. WHITTINGTON, 1 ♀ (NMSE). **Argyll & Bute:** Colonsay, ? Balnahard area, no details (SKIDMORE 2009). **East Ayrshire:** Stair, NS440235, 1.vi.2003, J. SKARTVEIT, 2 ♂♂ 2 ♀♀ (NMSE). **Dumfries and Galloway:** White Coomb, Donald's Cleuch, 20.vi.1997, K. P. BLAND, 2 ♂♂ (NMSE); Carrifran Valley, 8.vii.1997, A. E. WHITTINGTON, 1 ♂ (NMSE); Tynron, 21.iv.1980,

A. B. DUNCAN, 2 ♂♂ 3 ♀♀ (NMSE); Caerlaverock, 30.v.1980, A. B. DUNCAN, 1 ♀ (NMSE). **Scottish Borders:** Threepwood Moss, Roxburghshire, NT5142, 4.vi.1998, K. P. BLAND, 6 ♂♂ 1 ♀ (NMSE); Hairneylaw South, near Sourhope, NT845205, 19.iii.2003, D. MCCracken, 2 larvae (NMSE); Murder Moss, Whitelaw Mosses, 5.vi.1997, K. P. BLAND, 4 ♀♀ (NMSE); Blackpool Moss, Whitelaw Mosses, 5.vi.1997, K. P. BLAND, 2 ♂♂ (NMSE); Teviothead, T4406, 18.vi.1996, K. P. BLAND, 9 ♂♂ 2 ♀♀ (NMSE); Heriot, 28.vi.1898, W. EVANS (GRIMSHAW 1903).

Dilophus humeralis ZETTERSTEDT, 1850 – **Records:** SCOTLAND: **Highland:** Nethy Bridge at Broomhill House, NH9923, D. SMITH (NESBReC) [not seen].

Acknowledgements

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Literature

- BOVIEN, P. (1932): Om Angreb af Haarmyglarver (Bibionidae) i Danmark. ("On attacks by March-fly larvae in Denmark"). – Tidsskrift for Planteavl **37**: 488–498.
- BRINDLE, A. (1962): Taxonomic notes on the larvae of British Diptera. 6 – The family Bibionidae. – Entomologist **1962**: 22–26.
- CARTER, A. E. J. (1916): Diptera in a Forfarshire garden. – The Scottish Naturalist **1916**: 12.
- CHANDLER, P. (1998) (ed.): Checklist of insects of the British Isles (New Series). Part 1: Diptera. – Handbooks for the Identification of British Insects **12**: 1–234.
- DANDY, J. E. (1969): Watsonian Vice-counties of Great Britain. 38 pp. + 2 maps; London: The Ray Society.
- D'ARCY BURT, S. & BLACKSHAW, R. P. (1991): Bibionids (Diptera: Bibionidae) in agricultural land: a review of damage, benefits, natural enemies and control. – Annals of applied Biology **118**: 695–708.
- D'ARCY BURT, S. & CHANDLER, P. J. (1987): Irish Bibionidae and Scatopsidae (Diptera, Nematocera). – Irish Naturalist's Journal **22**: 224–228.
- DISNEY, H. (1978): Flies associated with flies (Diptera). – In: STUBBS, A. & CHANDLER, P. (eds): A Dipterist's Handbook. – The Amateur Entomologist **15**: 225 pp.; Hanworth: The Amateur Entomologists' Society.
- DUDA, O. (1930): Bibionidae. – Pp. 1–75. – In: LINDNER, E. (1926–1930) (ed.): Fliegen der palaearktischen Region **2**(1): 479 pp.; Stuttgart: E. Schweizerbart'sche Verlagsbuchhandlung.
- EDWARDS, E. E. (1941): The fever fly, *Dilophus febrilis* L., and methods for control of its larvae in cultivated lawns. – Annals of applied Biology **28**: 34–38.
- EDWARDS, F. W. (1921): Diptera Nematocera from Arran and Loch Etive. – The Scottish Naturalist **1921**: 89–92.
- EDWARDS, F. W. (1925): A synopsis of British Bibionidae and Scatopsidae (Diptera). – Annals of Applied Biology **12**: 263–275.
- EVANS, W. (1912): Food of the Common Partridge. – The Scottish Naturalist **1912**: 278–279.
- FITZGERALD, S. J. & SKARTVEIT, J. (1997): Holarctic distributions in the genus *Bibio* (Diptera, Bibionidae). – Entomologica Scandinavica **28**: 103–119.
- FREEMAN, P. & LANE, R. P. (1985): Bibionid and Scatopsid flies. Diptera; Bibionidae and Scatopsidae. – Handbooks for the Identification of British Insects **9**(7): 1–74.
- FROUZ, J.; SANTRUCKOVA, H. & ELHOTTOVA, D. (1999): The effect of bibionid larvae feeding on the microbial community of litter and on reconsumed excrements. – Pedobiologia **43**: 221–230.
- GRIMSHAW, P. H. (1895): A list of Perthshire Diptera collected in 1894. – The Annals of Scottish Natural History **1895**: 158–162.
- GRIMSHAW, P. H. (1899): Diptera Scotica: I – Perthshire. – The Annals of Scottish Natural History **1899**: 84–91.

- GRIMSHAW, P. H. (1900): *Diptera Scotica*: II – Inverness-shire. – *The Annals of Scottish Natural History* **1900**: 18–30.
- GRIMSHAW, P. H. (1903): *Diptera Scotica*: III – The Forth District. – *The Annals of Scottish Natural History* **1903**: 154–166.
- GRIMSHAW, P. H. (1905): *Diptera Scotica*: IV – Orkney and Shetland. *The Annals of Scottish Natural History* **1905**: 22–35.
- GRIMSHAW, P. H. (1907): On the *Diptera* of St. Kilda. – *The Annals of Scottish Natural History* **1907**: 150–158.
- GRIMSHAW, P. H. (1910): The insect fauna of grouse moors. – *The Annals of Scottish Natural History* **1910**: 149–162.
- GRIMSHAW, P. H. (1912): Note on the food of the Common Pheasant. – *The Scottish Naturalist* **1912**: 249–251.
- GRIMSHAW, P. H. (1914): *Diptera Scotica*: VI – The Western Isles. – *The Scottish Naturalist* **1914**: 205–213.
- GRIMSHAW, P. H. (1917): Spring *Diptera* in the Isle of Bute. – *The Scottish Naturalist* **1917**: 278.
- GRIMSHAW, P. H. (1920): Further additions to the *Diptera* of the Forth Area. – *The Scottish Naturalist* **1920**: 165–167.
- HAENNI, J.-P. (1982): Revision des espèces européennes du groupe de *Dilophus febrilis* (L.), avec description d'une espèce nouvelle (*Diptera*, Bibionidae). – *Revue suisse de Zoologie* **89**: 337–354.
- HAENNI, J.-P. (1997): Présence en Suisse d'un Bibionide méridional, *Dilophus bispinosus* LUNDSTR. (*Diptera*, Bibionidae). – *Bulletin Romand d'Entomologie* **15**: 17–19.
- HARDY, J. (1848): Occurrence of *Dilophus tenuis* at Redheugh. – *The Zoologist* **6**: 2165.
- HEATH, J. & SCOTT, D. (1972): Instructions for recorders. 28 pp.; Huntingdon: Biological Records Centre, Monks Wood Experimental Station.
- KRIVOSHEINA, N. P. (1986): Family Bibionidae. – Pp. 319–329. – In: SOÓS, Á. & PAPP, L. (eds): *Catalogue of Palearctic Diptera*. Sciaridae – Anisopodidae **4**: 441 pp.; Budapest: Akadémiai Kiadó & Amsterdam, Oxford, New York, Tokyo: Elsevier Science Publishers B. V.
- ICZN [= International Commission on Zoological Nomenclature] (1963): Opinion 678. The suppression under the plenary powers of the pamphlet published by MEIGEN, 1800. – *Bulletin of Zoological Nomenclature* **20**: 339–342.
- KARLE, I.-M. (1994): Hårmyggor av släktet *Bibio* (*Diptera*, Bibionidae) i Sverige, med tre för landet nya arter. – *Entomologisk Tidskrift* **115**: 157–164.
- LINNAEUS, C. (1758): *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*. – Editio decima, reformata **1**(1): 824 pp.; Holmiae [Stockholm]: Laurentii Salvii.
- LUNDSTRÖM, C. (1913): Neue oder wenig bekannte paläarktische Bibioniden. – *Annales Musei Nationalis Hungarici* **11**: 388–398.
- MEIGEN, J. W. (1800): Nouvelle classification des mouches à deux ailes (*Diptera* L.) d'après un plan tout nouveau. 40 pp.; Paris: J. J. Fuchs.
- MORRIS, H. M. (1921): The larval and pupal stages of the Bibionidae. – *Bulletin of entomological Research* **12**: 221–232.
- ÖSTBERG, A. (1992): De svenska hårmyggorna av släktet *Dilophus* (*Diptera*, Bibionidae), med en ny art för Sverige. – *Entomologisk Tidskrift* **113**: 47–51.
- PEDERSEN, B. V. (1971): *Diptera Nematocera*. – Pp. 1–71. – In: SPÄRCK, R. & TUXEN, S. L. (eds) (1928–1971): *The zoology of the Faroes* **2**(2) 42b: 451 pp.; Copenhagen: Andr. Fred. Høst & Søn.
- SAVILLE, B. (2002): *Dilophus bispinosus* LUNDSTRÖM (*Diptera*, Bibionidae) new to Scotland. – *Dipterists Digest*, Second series **9**: 18.
- SKARTVEIT, J. (1995): Distribution and flight periods of the Norwegian *Bibio* GEOFFROY, 1762 (*Diptera*, Bibionidae), with a key to the species. – *Fauna norvegica, Serie B* **42**: 83–112.
- SKARTVEIT, J. (1996a): Distribution and flight periods in Norwegian *Dilophus* MEIGEN, 1803 (*Diptera*, Bibionidae), with a key to species. – *Fauna norvegica, Serie B* **43**: 35–46.
- SKARTVEIT, J. (1996b): Nuptial insect prey of the *Rhamphomyia sulcata*-group (*Diptera*, Empididae) in South-West Norway. – *Dipterists Digest*, Second series **3**: 38–43.
- SKARTVEIT, J. (1999): Sexual dimorphism of last instar *Dilophus febrilis* (L.) larvae (*Diptera*, Bibionidae). – *Dipterists Digest*, Second series **6**: 22–28.
- SKARTVEIT, J. (2001): Sex ratios, emergence patterns and aspects of swarming and reproductive behaviour of *Bibio johannis* (L.) (*Diptera*, Bibionidae). – *Norwegian Journal of Entomology* **48**: 61–70.
- SKARTVEIT, J. (2002a): The larvae of European Bibioninae (*Diptera*, Bibionidae). – *Journal of Natural History* **36**: 449–485.
- SKARTVEIT, J. (2002b): Variation in fecundity in relation to female size and altitude in Palearctic Bibioninae (*Diptera*, Bibionidae). – *Studia dipterologica* **9**: 113–127.
- SKARTVEIT, J. (2006): Synonymy notes in the Bibionidae (*Diptera*). – *Dipterists Digest*, Second series **13**: 23–25.
- SKARTVEIT, J.; GREVE, L. & KOBRO, S. (2005): Population fluctuations in *Bibio clavipes* MEIGEN, 1818 (sensu stricto) (*Diptera*, Bibionidae) in South-Eastern Norway as indicated by light trap catches. – *Dipterists Digest*, Second series **12**: 97–99.
- SKARTVEIT, J. & KAPLAN, F. (1996): The Bibionidae (*Diptera*) of Israel. – *Israel Journal of Entomology* **30**: 71–90.
- SKARTVEIT, J. & SOLHØY, T. (1997): Growth in three species of *Bibio* (*Diptera*, Bibionidae) larvae under alpine conditions in Norway. – *Pedobiologia* **41**: 263–278.
- SKIDMORE, P. (2008): A provisional list of the *Diptera* of Tiree. – *Dipterists Digest*, Second series **15**: 53–65.

SKIDMORE, P. (2009): A review of the Diptera of the Western Isles of Scotland. – *Dipterists Digest*, Second series **15**: 99–194.

WALKER, F. (1856): *Insecta Britannica. Diptera* **3**. 352 pp.; London: Lovell Reeve.

YERBURY, J. W. (1912): A list of the Diptera met with in Wester Ross, with notes on other species known to occur in the neighbouring areas. – *The Scottish Naturalist* **1912**: 226–232.

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